Xenetic BIOSCIENCES

Corporate Presentation
April 2024

nasdaq: XBIO
xeneticbio.com

Forward Looking Statements

This presentation contains forward-looking statements that we intend to be subject to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. All statements contained in this presentation other than statements of historical facts constitute forward-looking statements within the meaning of the federal securities laws. These statements can be identified by words such as “may,” “will,” “would,” “could,” “should,” “expect,” “plan,” “anticipate,” “believe,” “estimate,” “seek,” “approximately,” “intend,” “predict,” “potential,” “projects,” “upcoming”, “opportunity”, “focus”, “aim”, “advance”, “working”, “target” or “continue,” including the plural and negative of such terms, and other words of similar meaning. These forward-looking statements include, but are not limited to, all statements concerning: the DNase I technology platform, including regarding our focus on advancing the proprietary technology platform to address multiple high-value cancer indications and such platform being aimed at improving immunotherapies by targeting Neutrophil Extracellular Traps (NETs); our belief that DNase is an innovative oncology solution; our belief that DNase I provides an opportunity to address multiple oncology indications; our belief that DNase I has the potential to improve current cancer therapies; our currently planned Phase 1 study; our plans to initially target pancreatic carcinoma and our belief that there is significant unmet need with respect to such treatment; our expectation that we will be successful with respect to pancreatic cancer and our belief that there is relatively low hurdle for demonstrating clinical meaningfulness with respect thereto; our belief that targeting solid tumors provides opportunities for significant upside; all statements regarding our collaboration with VolitionRX, including expectation of advancing such collaboration, our plans to develop proprietary adoptive cell therapies potentially targeting multiple solid cancer types and expectations regarding Volition funding a research program and sharing profits from commercialization and licensing of any products resulting therefrom; and all statements under the “Innovative Oncology Pipeline”, “Key Upcoming Milestones” and “Investment Summary” sections, including statements relating to expected timing of advancing the technology platform to a Phase 1 study and anticipated completion of multiple key value-driving milestones.

Any forward-looking statements contained herein are based on current expectations and are subject to a number of risks and uncertainties. Many factors could cause our actual activities or results to differ materially from the activities and results anticipated in forward-looking statements. Important factors that could cause actual results to differ materially from such plans, estimates or expectations include, among others, (1) uncertainty of the expected financial performance of the Company; (2) failure to realize the anticipated potential of the DNase I platform or PolyXen technologies; (3) the ability of the Company to implement its business strategy; (4) unexpected costs, charges or expenses resulting from the DNase platform, including from any manufacturing and collaboration agreements; (5) the ability of the Company to obtain funding to finance its business and the Company’s need to raise additional working capital in the future for the purpose of further developing its pipeline and to continue as a going concern; and (6) other risk factors as detailed from time to time in the Company’s reports filed with the SEC, including its annual report on Form 10-K, periodic quarterly reports on Form 10-Q, periodic current reports on Form 8-K and other documents filed with the SEC. The foregoing list of important factors is not exclusive. In addition, forward-looking statements may also be adversely affected by general market factors, general business and economic conditions, including potential adverse effects of public health issues, such as the COVID-19 outbreak, and geopolitical events, such as the Russian invasion of Ukraine and conflict in the Middle East, on economic activity, competitive product development, product availability, federal and state regulations and legislation, the regulatory process for new product candidates and indications, manufacturing issues that may arise, patent positions and litigation, among other factors. The forward-looking statements contained in this presentation speak only as of the date the statements were made, and the Company does not undertake any obligation to update forward-looking statements, except as required by law.

Disclaimer

The information contained in this presentation is provided for informational and discussion purposes only and is not, and may not be relied on in any manner as legal, business, financial, tax or investment advice or as an offer to sell or a solicitation of an offer to buy an interest in Xenetic Biosciences, Inc. or to participate in any trading strategy.

Investment Highlights

Focused on advancing proprietary technology platform to address multiple high-value cancer indications

DNase I Oncology Platform

Aimed at improving immunotherapies by targeting Neutrophil Extracellular Traps (NETs)

The Power of Leveraging DNase I

The Problem

NETs promote tumorigenesis and metastasis by shielding tumor cells from the immune system

NETs can also contribute to resistance to chemotherapy, checkpoint inhibitors and radiotherapy

DNase I – Our Innovative Solution

DNase I is an enzyme that digests DNA and can eliminate NETs

Exposes cancer cells to the immune system, chemotherapy and other targeted cancer treatments

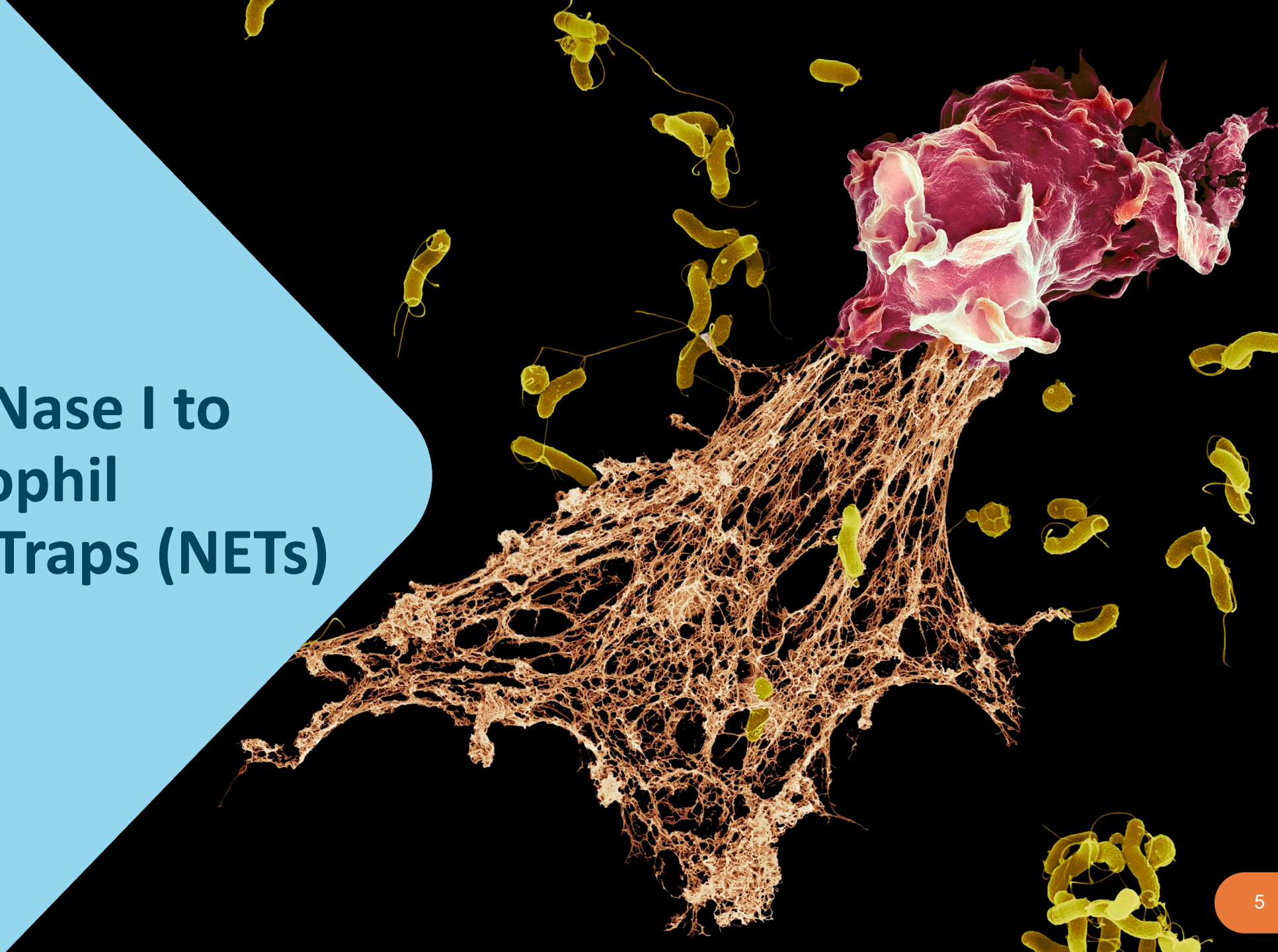
Innovative Oncology Pipeline

Opportunity to Address Multiple Oncology Indications

DNase I

PROGRAM	TECHNOLOGY	INDICATIONS	PRECLINICAL	IND ENABLING	PHASE 1	PHASE 2	HIGHLIGHTS
XBIO-015	Systemic DNase I (+Chemo)	Pancreatic Carcinoma					Working toward study to evaluate combination with chemo
	Systemic DNase I (+ICIs)	Solid Tumors					Working toward study to evaluate combination with ICIs
	Systemic DNase I (+CAR T)	Solid Tumors					Potential to enhance CAR T cell function in the tumor microenvironment
XBIO-020	DNase I-Armored CAR T	Solid Tumors					Potential to enhance CAR T cell function in the tumor microenvironment

Leveraging DNase I to Target Neutrophil Extracellular Traps (NETs)



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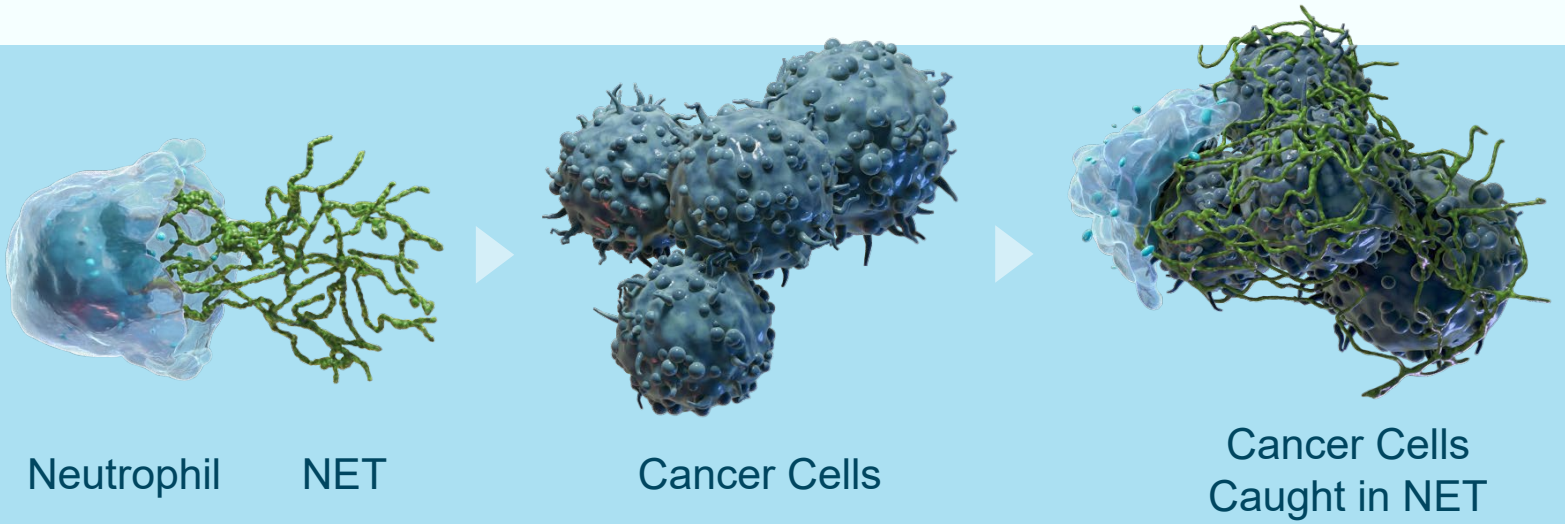
The Role of Neutrophil Extracellular Traps (NETs)

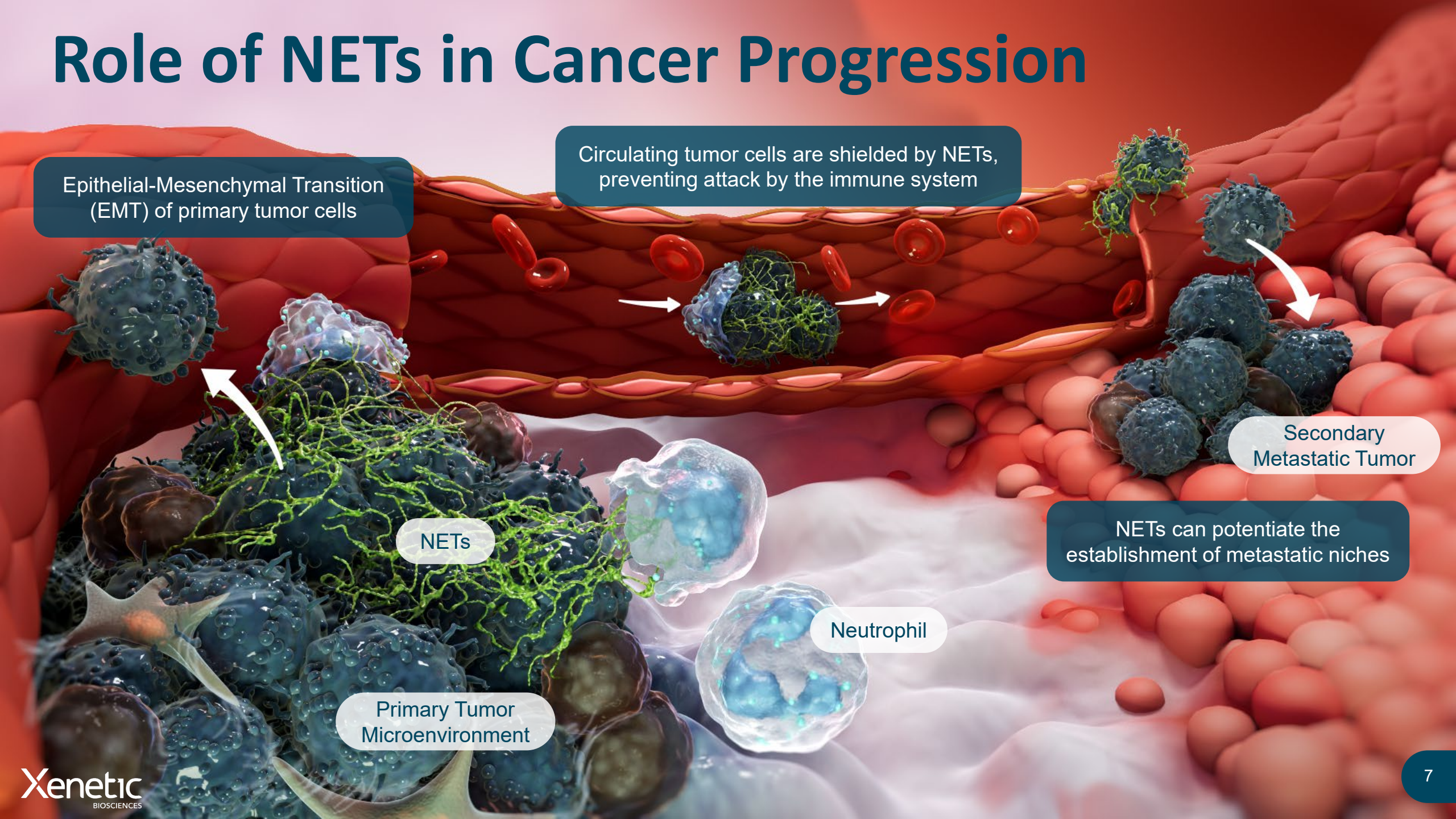
NETs are an Innate Immune Response to Kill Invading Pathogens

NETs are composed of cell-free DNA, histones, neutrophil elastase, MMP-9 and other proteins



Elevated levels of NETs lead to inflammation and a pro-tumorigenic environment that potentiates coagulopathies and cancer progression

Role of NETs in Cancer Progression



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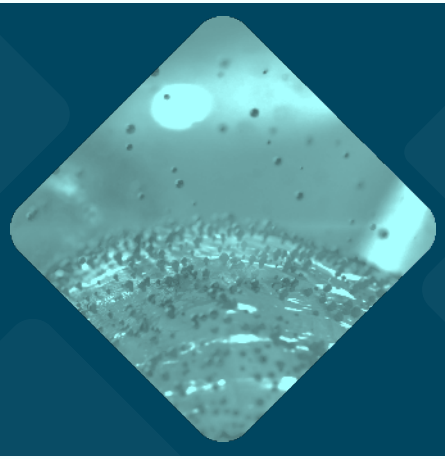
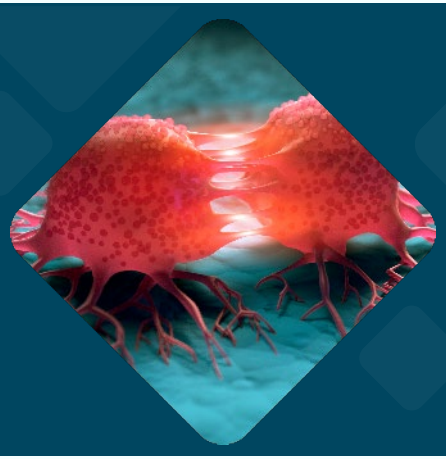
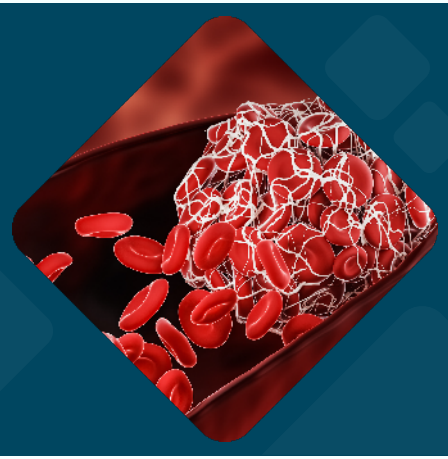
NETs Can Limit the Effectiveness of Current Cancer Therapies



Shaping of the Tumor Microenvironment (TME)



Engaging in Pro-tumorigenic and Immunosuppressive Signaling, thereby Promoting Cancer Cell Proliferation, Invasion and Metastasis



Promoting Hypercoagulability and Treatment-Associated Thrombosis Exacerbated by Chemotherapy

The Literature Confirms the Presence of NETs is Associated with a Poor Prognosis

cancers

Neutrophils Extracellular Traps Inhibition Improves PD-1 Blockade Immunotherapy in Colorectal Cancer

Hongji Zhang, Yu Wang, Amblessed Onuma, Jiayi He, Han Wang, Yujia Xia, Rhea Lal 5, Xiang Cheng, Gyulnara Kasumova, Zhiwei Hu, Meihong Deng, Joal D. Beane, Alex C. Kim, Hai Huang, and Allan Tsung

CANCER RESEARCH

Neutrophils Extracellular Traps Promote the Development and Progression of Liver Metastases after Surgical Stress

Samer Tohme, Hamza O. Yazdani, Ahmed B. Al-Khafaji, Alexis P. Chidi, Patricia Loughran, Kerri Mowen, Yanming Wang, Richard L. Simmons, Hai Huang, Allan Tsung

JEM

Interleukin-17-Induced Neutrophil Extracellular Traps Mediate Resistance to Checkpoint Blockade in Pancreatic Cancer

Yu Zhang, Vidhi Chandra, Erick Riquelme Sanchez, Prasanta Dutta, Pompeyo R Quesada, Amanda Rakoski, Michelle Zoltan, Nivedita Arora, Seyda Baydogan, William Horne, Jared Burks, Hanwen Xu, Perwez Hussain, Huamin Wang, Sonal Gupta, Anirban Maitra, Jennifer M Bailey, Seyed J Moghaddam, Sulagna Banerjee, Ismet Sahin, Pratip Bhattacharya, Florencia McAllister

HEPATOLOGY

Neutrophil Extracellular Traps Promote Inflammation and Development of Hepatocellular Carcinoma in Nonalcoholic Steatohepatitis

Dirk J van der Windt, Vikas Sud, Hongji Zhang, Patrick R Varley, Julie Goswami, Hamza O Yazdani, Samer Tohme, Patricia Loughran, Robert M O'Doherty, Marta I Minervini, Hai Huang, Richard L Simmons, Allan Tsung

BJHaem
BRITISH JOURNAL OF HAEMATOLOGY

Citrullinated Histone H3, a Biomarker for Neutrophil Extracellular Trap Formation, Predicts the Risk of Mortality in Patients with Cancer

Ella Grilz, Lisa-Marie Mauracher, Florian Posch, Oliver Königsbrügge, Sabine Zöchbauer-Müller, Christine Marosi, Irene Lang, Ingrid Pabinger, Cihan Ay

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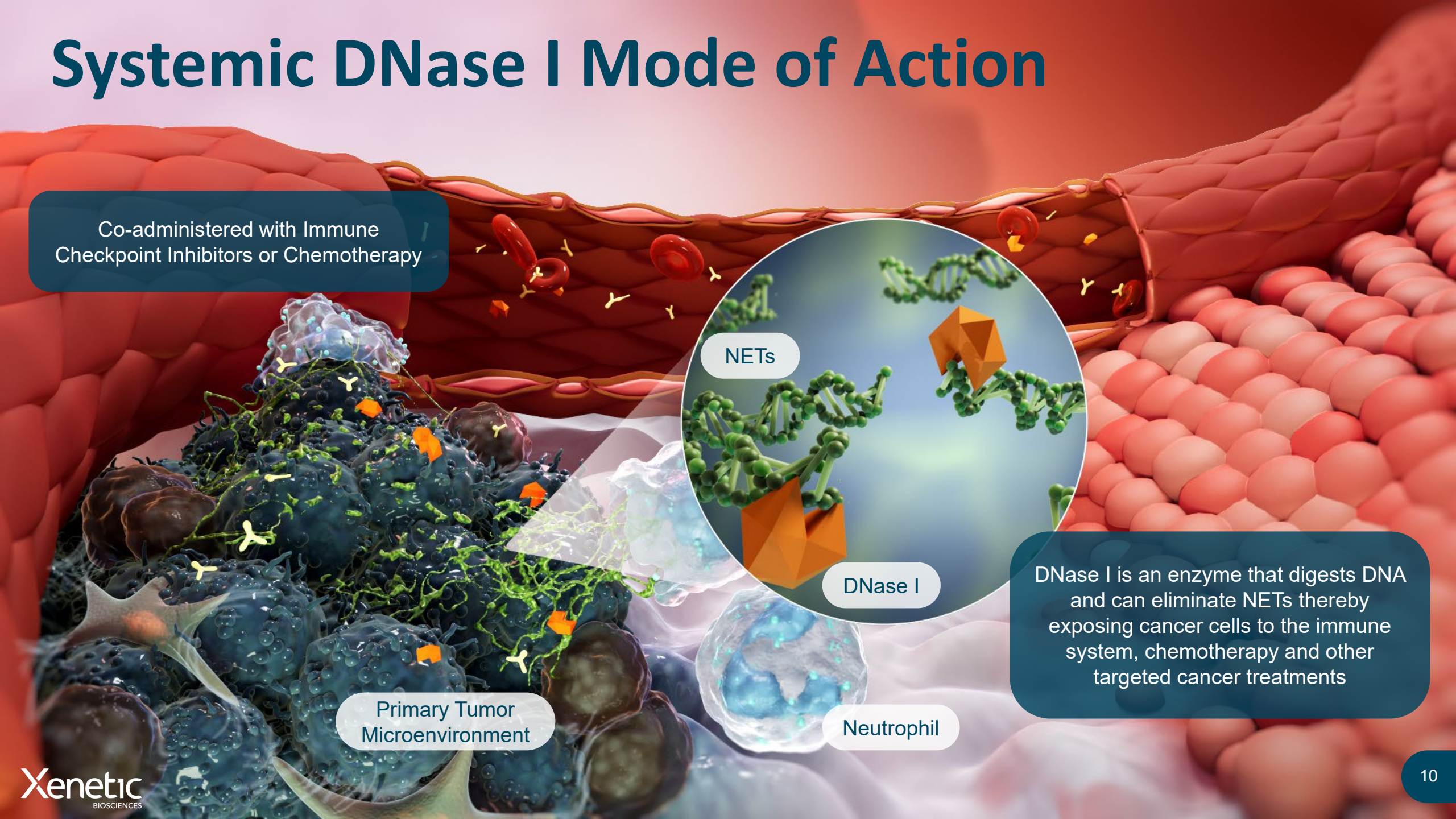
Systemic DNase I Mode of Action



DNase I is an enzyme that digests DNA and can eliminate NETs thereby exposing cancer cells to the immune system, chemotherapy and other targeted cancer treatments

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DNase I Has the Potential to Improve Current Cancer Therapies

Overcome T cell exclusion and immunosuppressive signals by the tumor microenvironment (TME)

Improve side effect profiles of current ChemoRx

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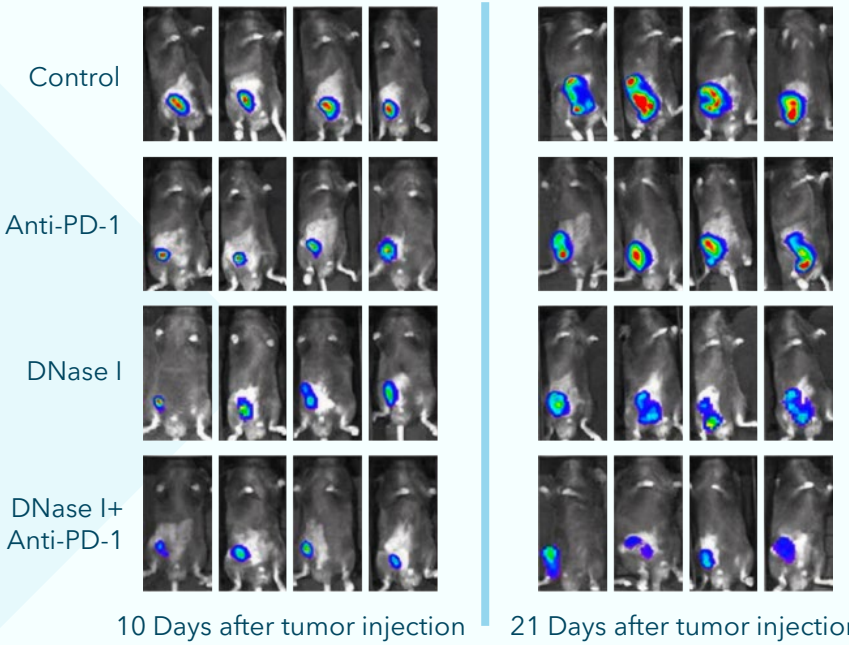
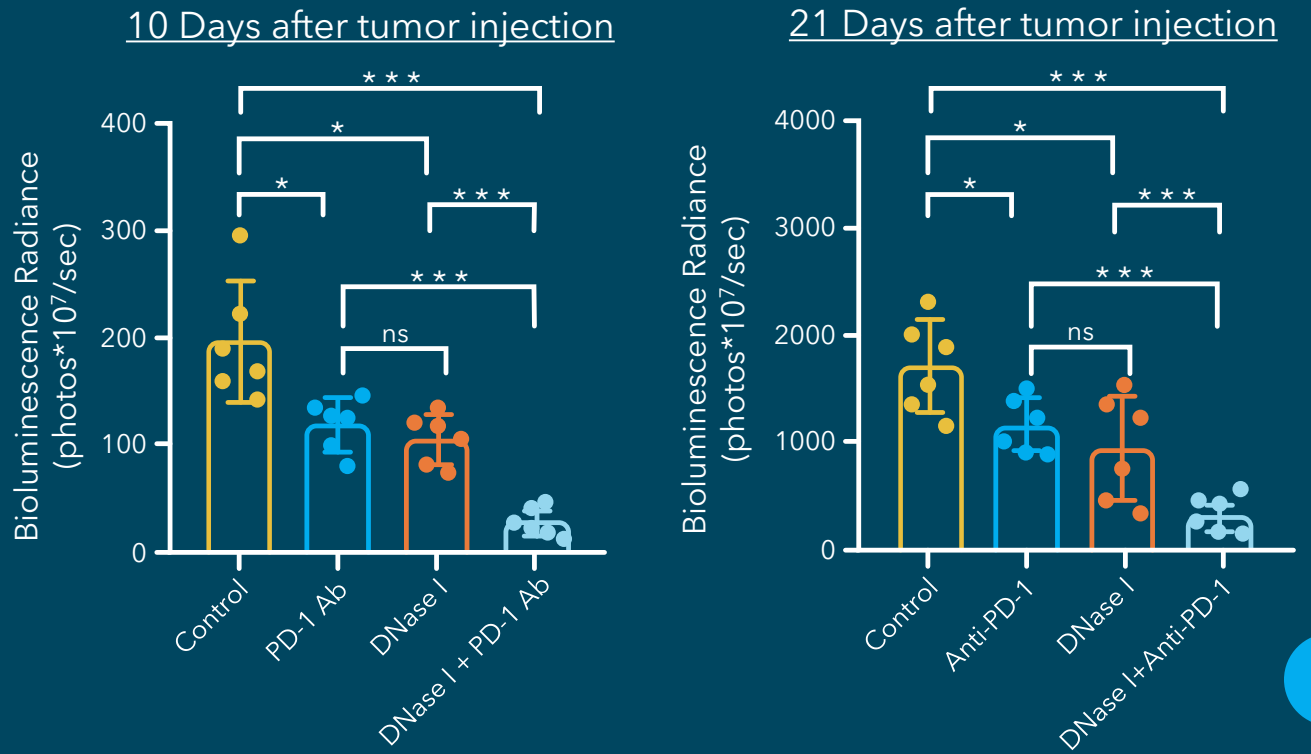
DNase I Improves Efficacy of PD-1 Blockade

Systemic administration of DNase I improves the efficacy of PD-1 blockade to reduce the growth of cancer in MC38 colorectal cancer cell model

Combination of DNase I and anti-PD-1 mAb resulted in the lowest tumor volume growth, superior to either DNase I or anti-PD-1 alone

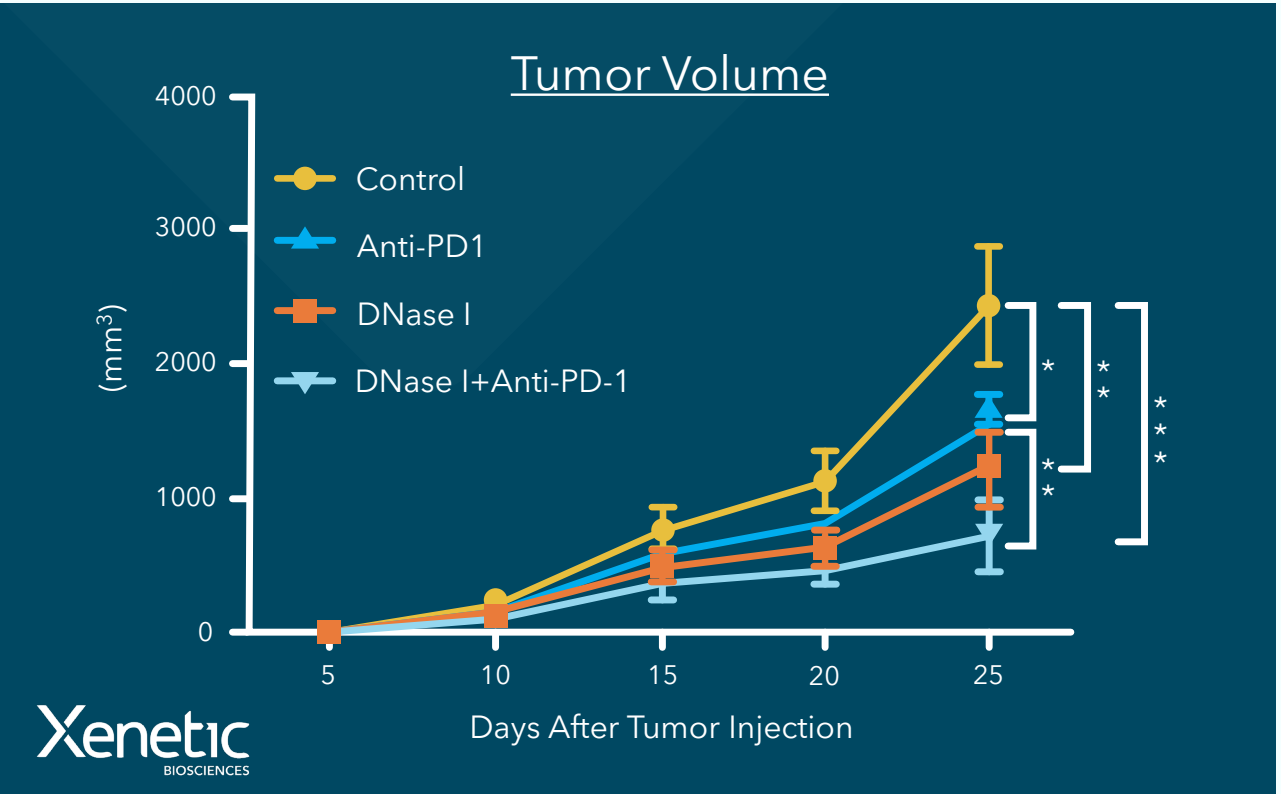


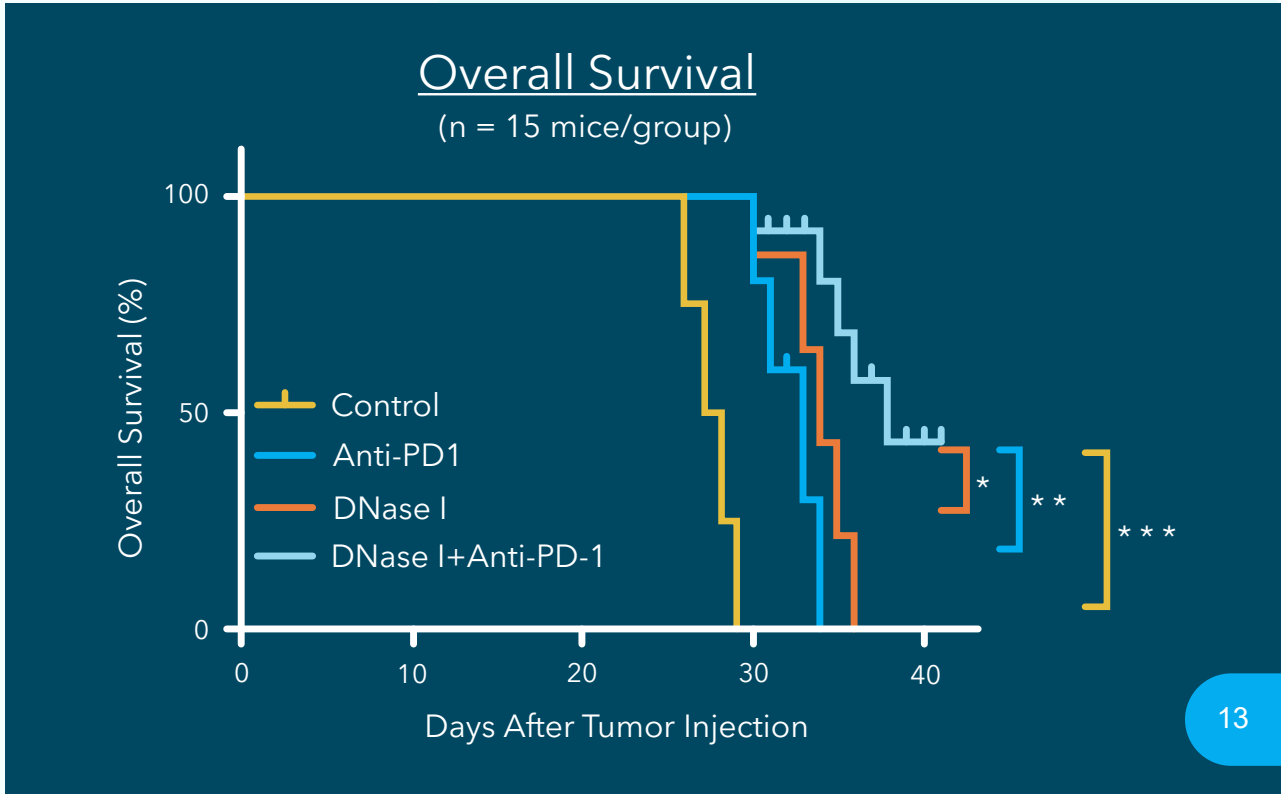


Zhang, H.; Wang, Y.; Onuma, A.; He, J.; Wang, H.; Xia, Y.; Lal, R.; Cheng, X.; Kasumova, G.; Hu, Z.; Deng, M.; Beane, J.D.; Kim, A.C.; Huang, H.; Tsung, A. Neutrophils Extracellular Traps Inhibition Improves PD-1 Blockade Immunotherapy in Colorectal Cancer. Cancers 2021, 13, 5333. https://doi.org/10.3390/cancers13215333

DNase I Slowed Tumor Growth and Prolonged Survival

Systemic Administration of DNase I and Anti-PD-1 Resulted in the Slowest Tumor Growth and Prolonged Overall Survival in MC38 Colorectal Cancer Cell Model





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Systemic DNase I Administration Enhances Antitumor Activity of FOLFOX Chemotherapy in a Model of CRC

CT26 Colorectal Carcinoma

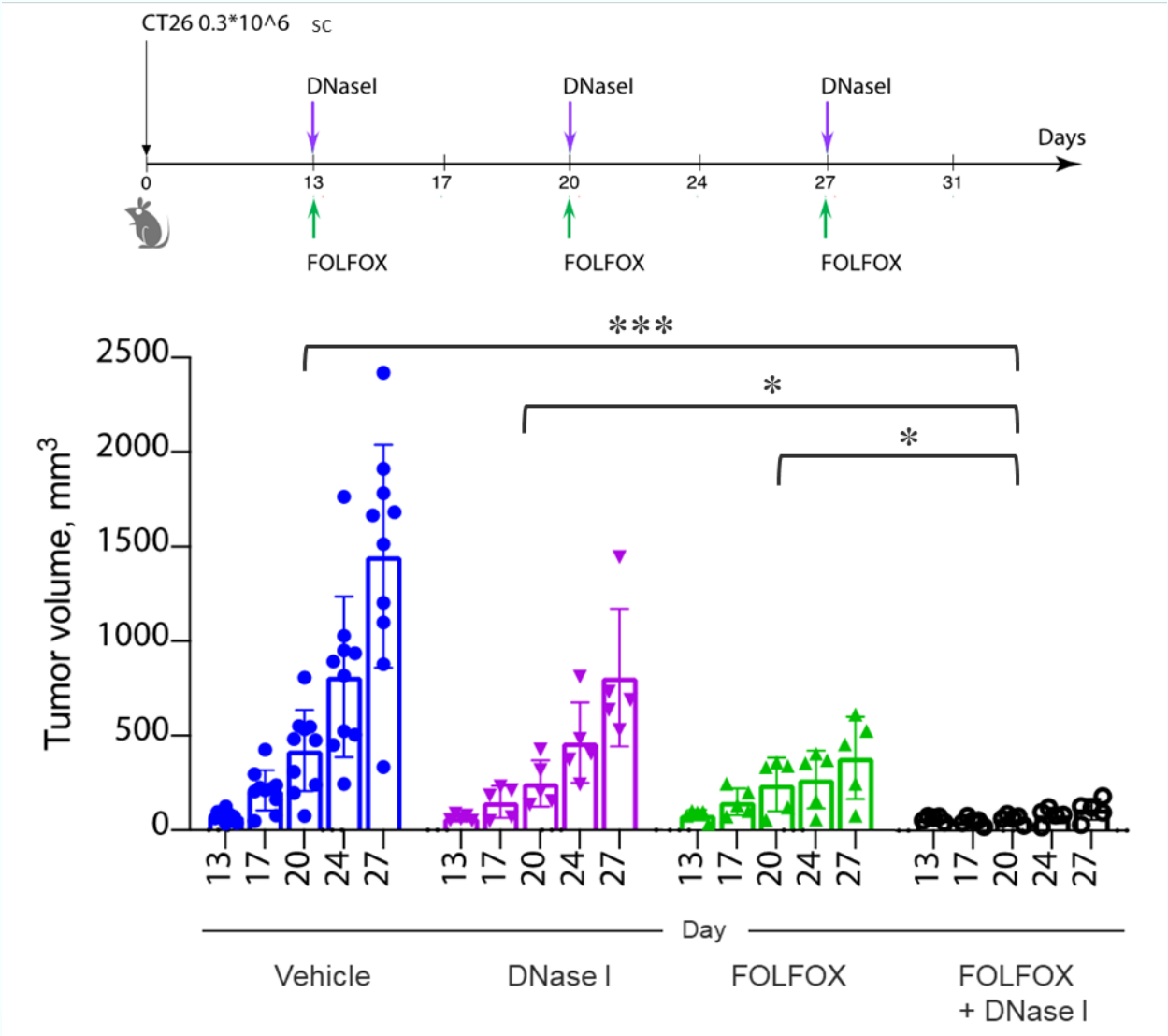
Intraperitoneal implant, Day 0

Dosing start, Day 2

* P < 0.05

** P < 0.01

*** P < 0.005



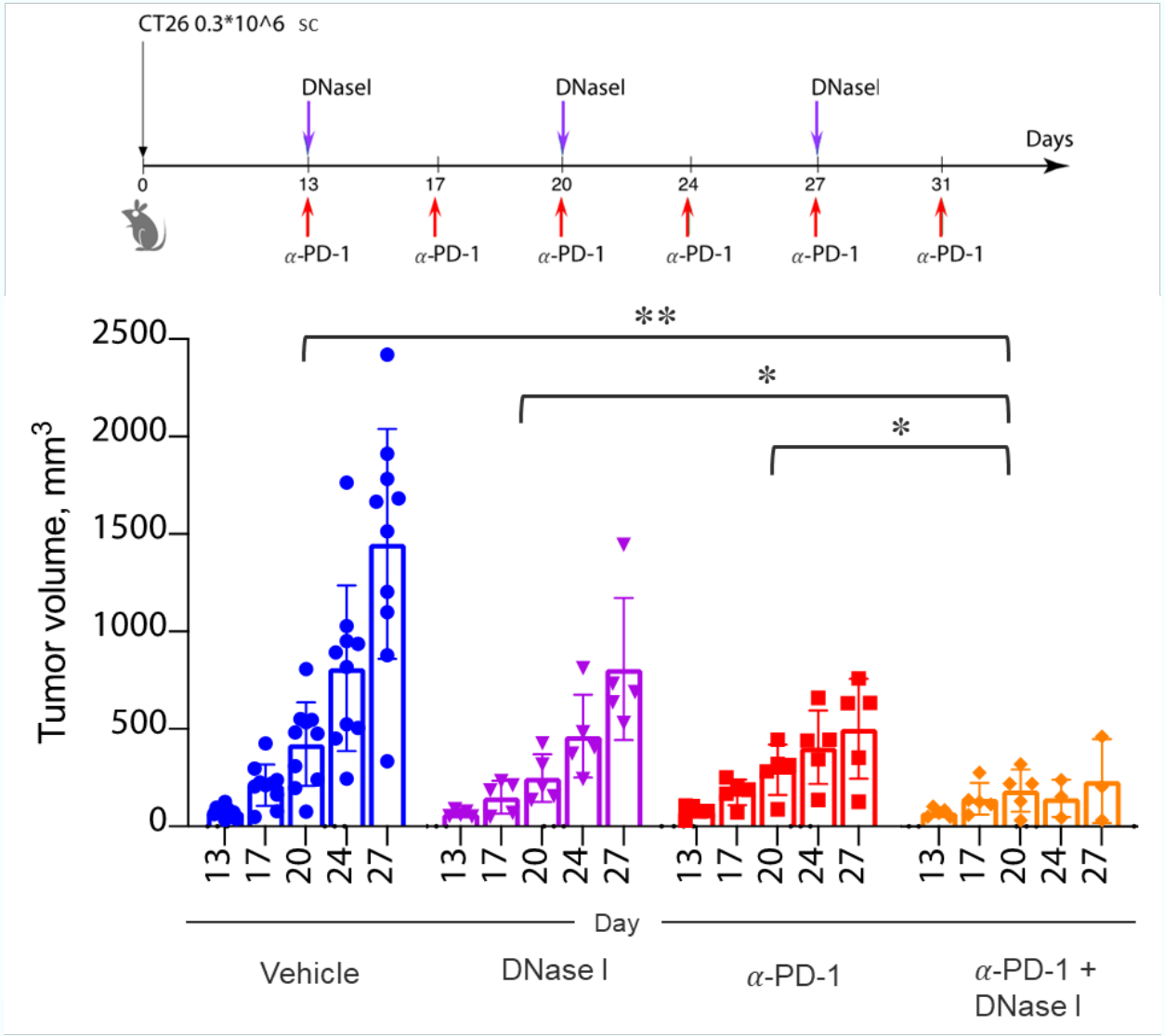
Systemic DNase I Administration Enhances Antitumor Activity of α-PD-1 Immunotherapy in a Model of CRC

CT26 Colorectal Carcinoma

Subcutaneous implant, Day 0

Dosing start, Day 13

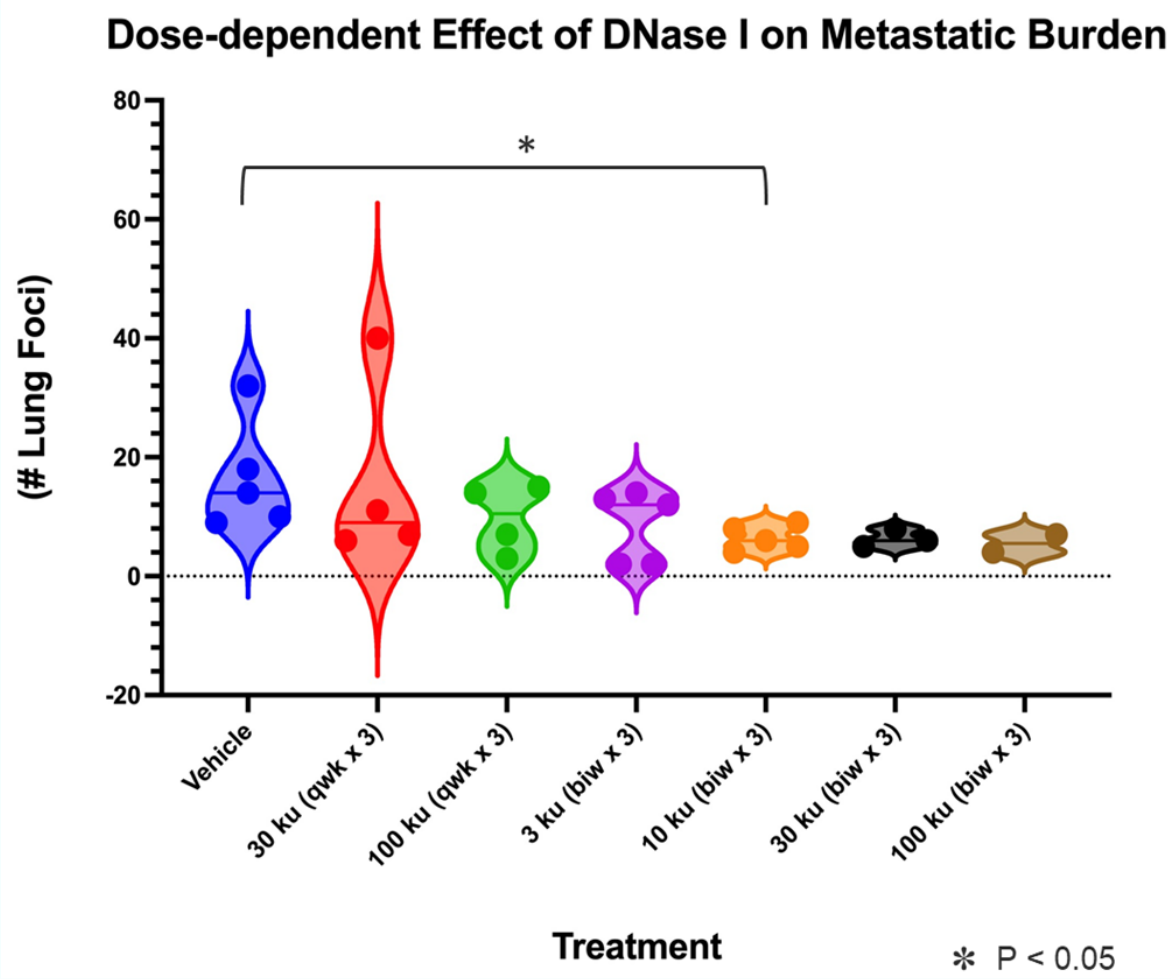
- * P < 0.05
- ** P < 0.01
- *** P < 0.005



DNase I Reduces Metastatic Burden in a 4T1 TNBC Model

4T1 TNBC
Mammary fat pad implant, Day 0
Dosing start, Day 7
Lung metastases assessed, Day 19

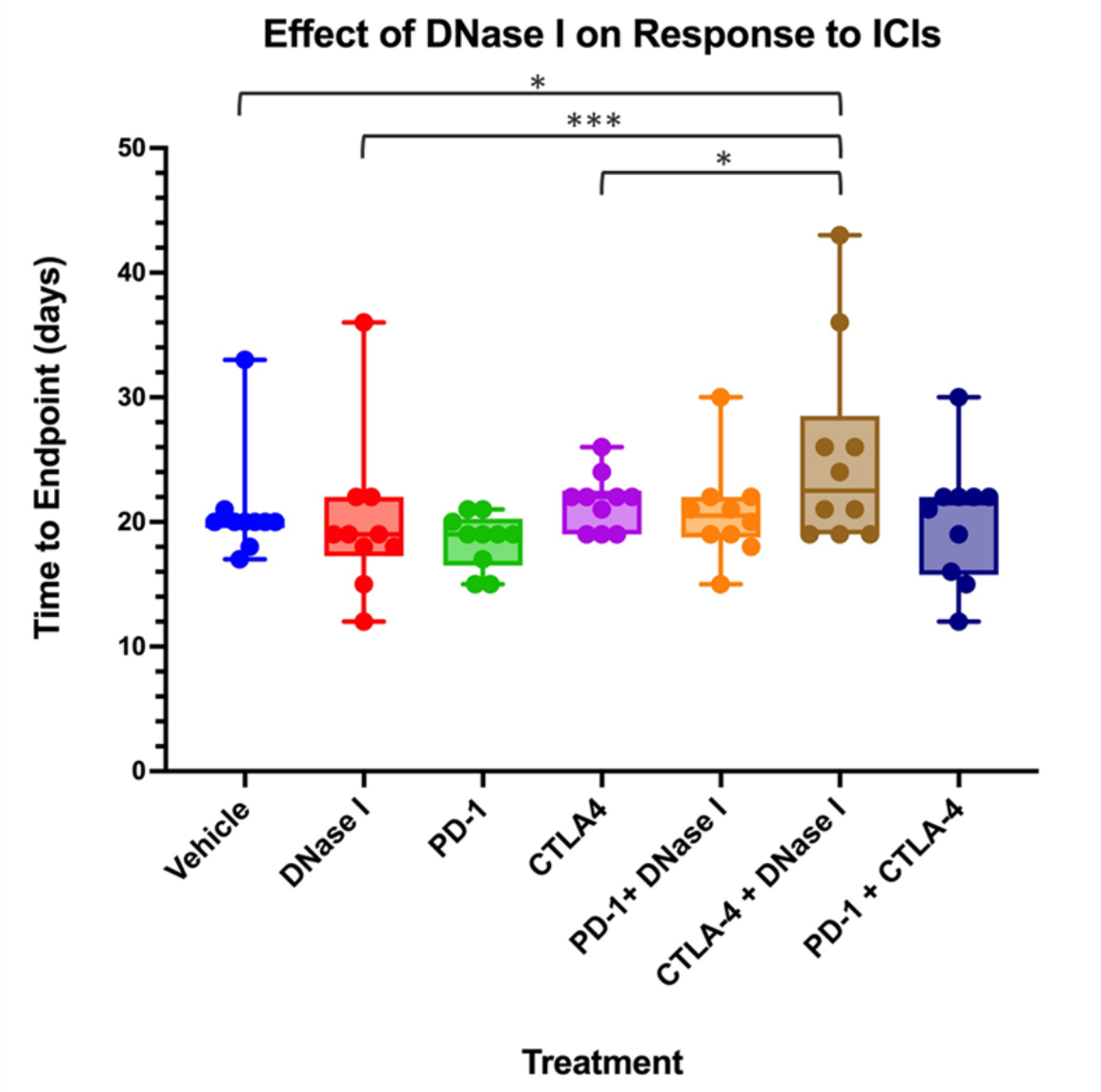
*ku = Kunitz units/Dose



DNase I Enhances Anti-Tumor Activity of α-CTLA-4

CT26 Colorectal Carcinoma
Intraperitoneal implant, Day 0
Dosing start, Day 2

- * P < 0.05
- ** P < 0.01
- *** P < 0.005



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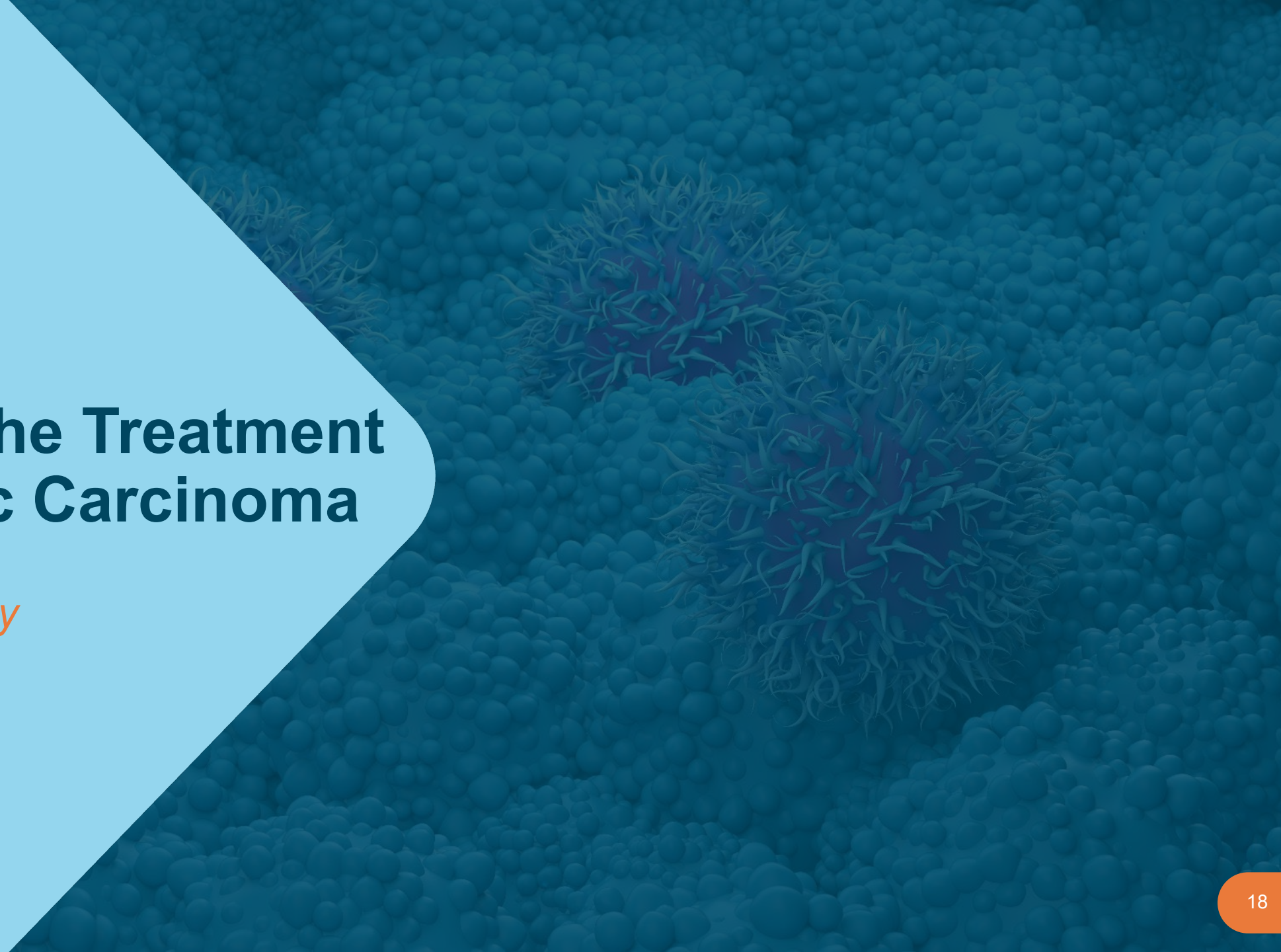
DNase I for the Treatment of Pancreatic Carcinoma

Advancing Toward First-In-Human Study



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Initially Targeting Pancreatic Carcinoma

Multi-Billion-Dollar Indication with Significant Unmet Need

Early detection is currently not feasible – most patients are diagnosed at advanced stages

5-year survival for advanced stage patients: ***~3%[1]***

3rd Deadliest Cancer in the United States[1]

~62,000 Diagnosed Annually[2]

~50,000 Deaths Annually[2]

$4.8B Projected Market by 2025[3]

1. U.S. Department of Health and Human Services. (n.d.). Common cancer sites - Cancer stat facts. SEER. Retrieved March 17, 2023, from https://seer.cancer.gov/statfacts/html/common.html
2. NIH National Cancer Institute, Surveillance, Epidemiology and End Results Program,Cancer Stat Facts: Pancreatic Cancer, https://seer.cancer.gov/statfacts/html/pancreas.html
3. Grand View Research, Inc. (n.d.). Global pancreatic cancer treatment market size report, 2025. Retrieved March 17, 2023, from https://www.grandviewresearch.com/industry-analysis/pancreatic-cancer-treatment-market

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Currently Planned Phase 1 Study

Multicenter, dose escalation and dose-expansion in subjects with locally advanced or metastatic solid tumors

IV administration of rhDNase I

Monotherapy dose escalation followed by expansion in two cohorts

Combined with chemotherapy for pancreatic cancer patients

Combined with immunotherapy for patients with other solid tumor indications

Primary Endpoints: safety, tolerability, efficacy, MTD and recommended Phase 2 dose

Secondary Endpoints: PK, Efficacy (ORR by RECIST)

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Key Drivers for Success

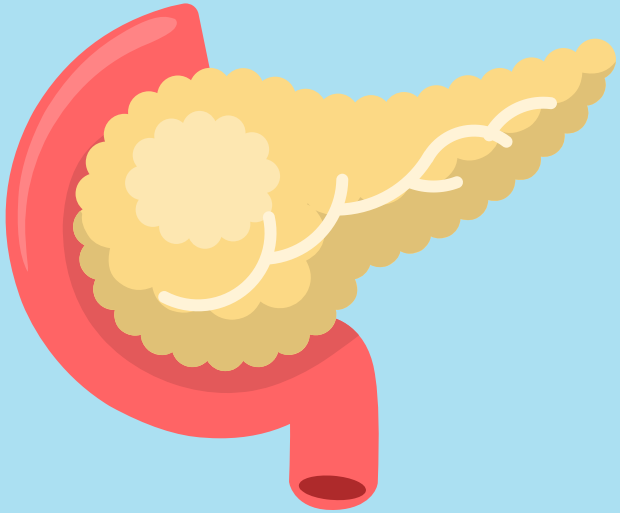
Pancreatic Cancer is a Challenging Indication but We Believe We Will Be Successful

1L PDAC has 40% ORR, 7.5 months PFS, 11.1 months OS

Ipsen's NAPOLI-3 Study[1]

NALIRIFOX demonstrated 42% ORR vs. 36% ORR for nab-paclitaxel and gemcitabine

mPFS for NALIRIFOX was 7.4 months vs. 5.6 months for nab-paclitaxel and gemcitabine



Relatively Low Hurdle for Demonstrating Clinical Meaningfulness

ORR > 50% or PFS > 9 Months Would be Meaningful Improvement to Current SOC

1. Ipsen presents phase III napoli 3 trial of Onivyde® regimen demonstrating positive survival results in previously untreated metastatic pancreatic ductal adenocarcinoma at ASCO GI. Ipsen. (2023, May 26). https://www.ipsen.com/press-releases/ipsen-presents-phase-iii-napoli-3-trial-of-onivyde-regimen-demonstrating-positive-survival-results-in-previously-untreated-metastatic-pancreatic-ductal-adenocarcinoma-at-asco-gi/

Application Across a Number of Solid Tumors

~1.9 million new solid tumor cases in the U.S. in 2022[1]

~.6 million solid tumor related deaths in the U.S. in 2022[1]

Breast

~290K

New Cases Annually[1]

Lung

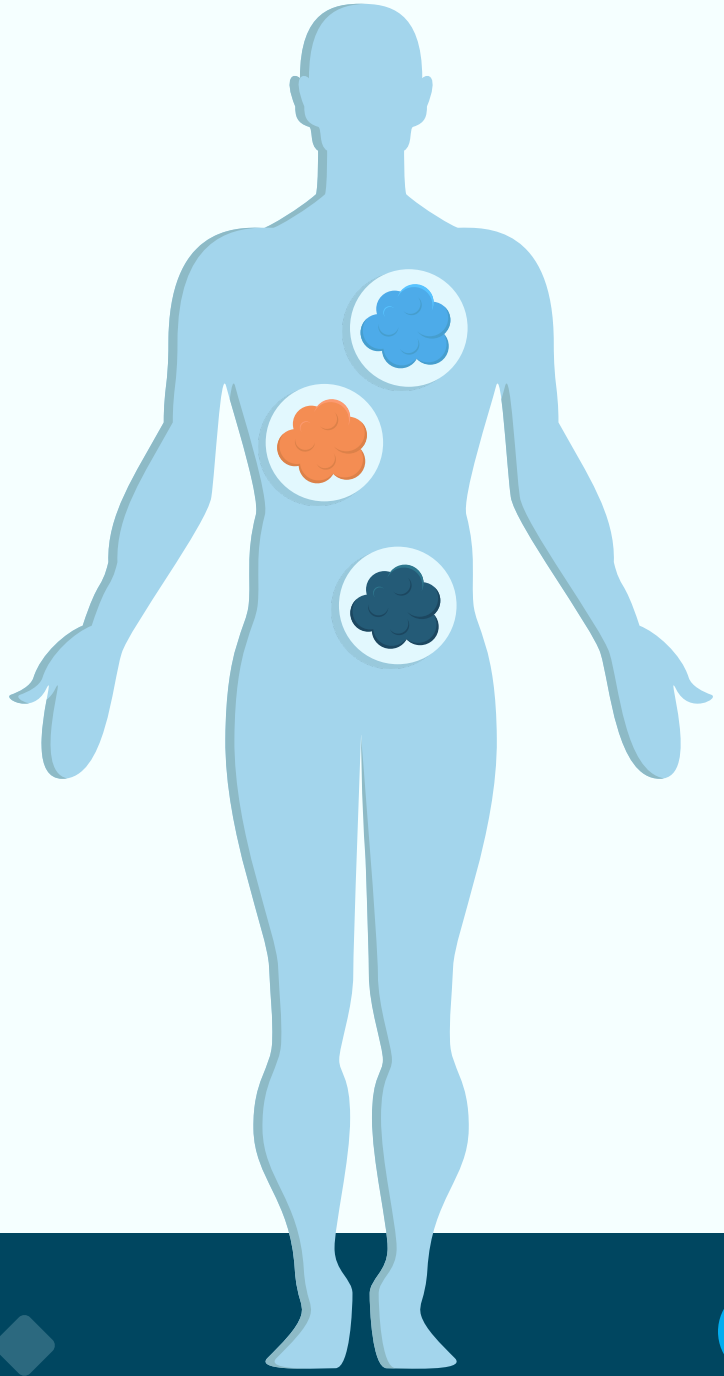
~254K

New Cases Annually[1]

Gastrointestinal

~343K

New Cases Annually[1]



1. 2022, American Cancer Society, Inc. Surveillance and health Equity Science

DNase I Armored CAR T

Targeting Solid Tumors Provides Opportunities for Significant Upside

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DNase I Armored CAR T for Solid Tumors

Requirements for Successful T Cell Therapies in Solid Tumors

- Find the tumor
- Infiltrate and persist in tumor
- Maintain cytotoxic function

Barriers to Success in the Tumor Microenvironment

- Physical barriers (e.g., extracellular matrix or NETs) impeding infiltration and occluding tumor cell contact
- Immunosuppressive signaling from bioactive elements within the TME

DNase I-Armored CAR T for Solid Tumors

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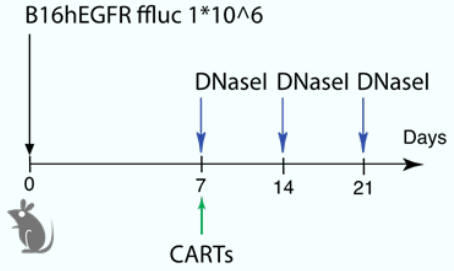
Systemic DNase I Enhances CAR T Antitumor Activity in the B16 Model of Metastatic Melanoma

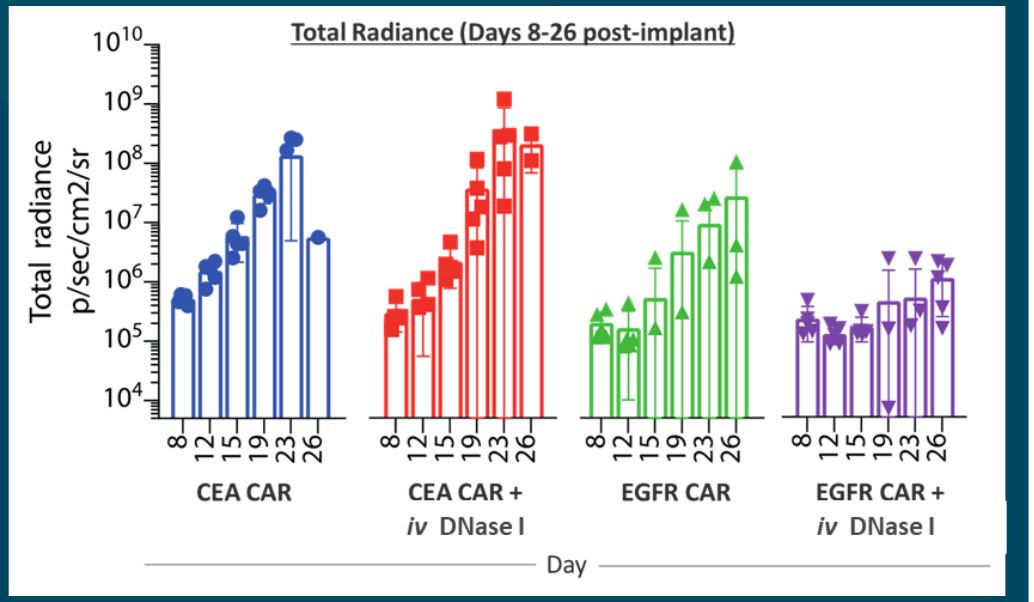
B16-hEGFR melanoma
Intravenous implant



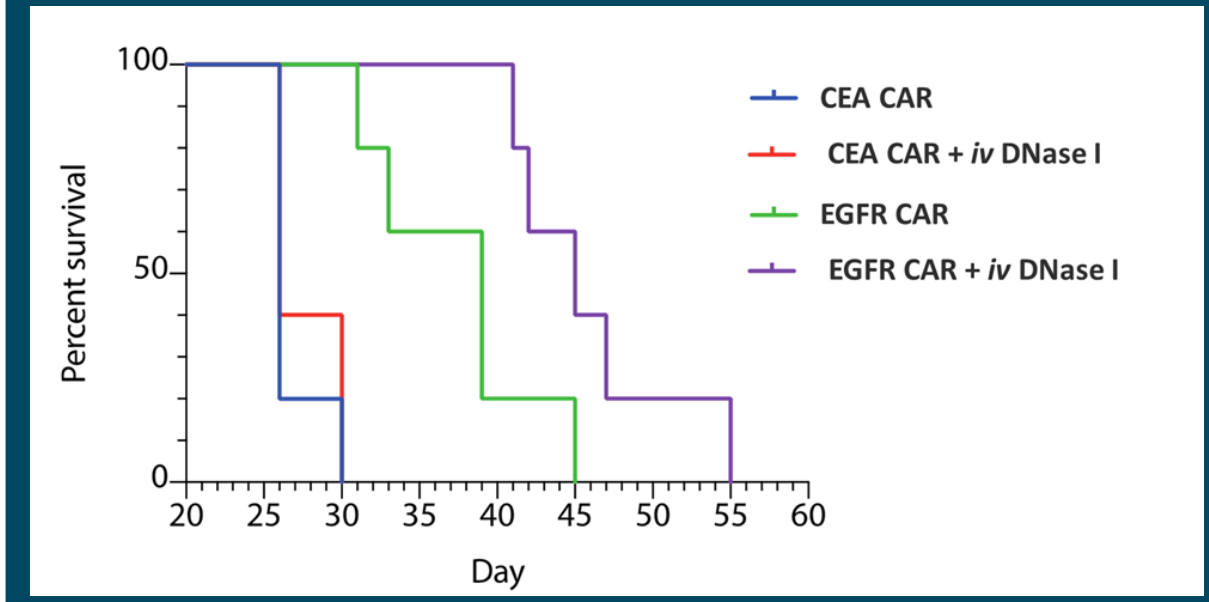
CAR constructs: anti-hEGFR.CD28.CD3z /GFP
anti-hCEA.CD28.CD3z /GFP

Group 1:	2 x 10^6 CEA CAR-T	*(negative control)*
Group 2:	2 x 10^6 CEA CAR-T + *iv* DNase I	*(negative control + iv DNase I)*
Group 3:	2 x 10^6 EGFR CAR-T	
Group 4:	2 x 10^6 EGFR CAR-T + *iv* DNase I	

Tumor Burden



Kaplan-Meier Survival by Group



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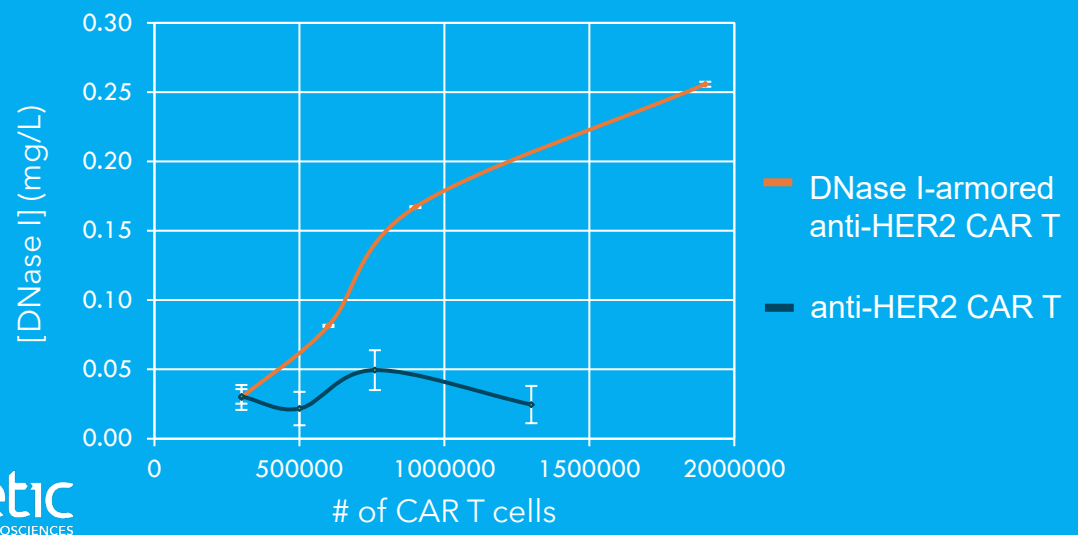
DNase I Armored CAR T: Proof of Concept

Ability to Design CAR T Cells That Deliver DNase I While Maintaining CAR T Function

HER2-Targeting, DNase I-Armored CAR T Cells:

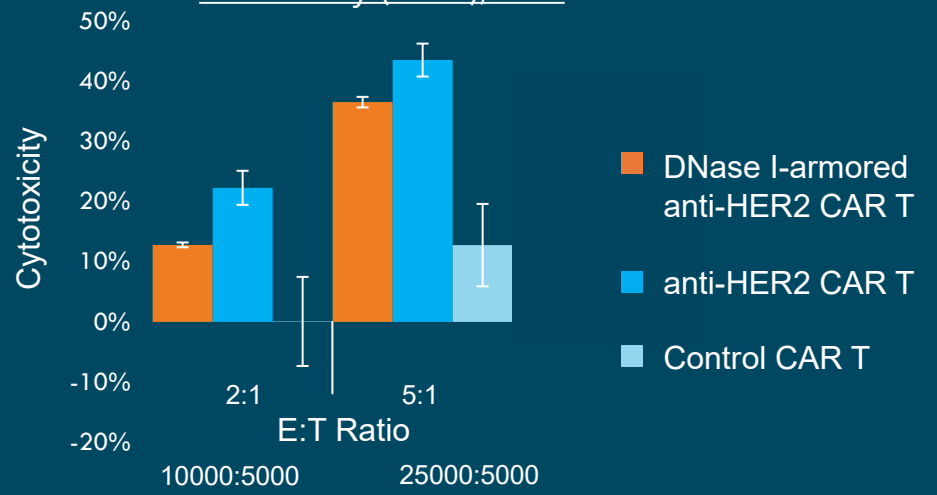
Secrete DNase I

DNase I levels in culture media



Retain Cytotoxic Function

CTL assay (LDH), 27h



Target Cell Line: BT-474 (HER2+)

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Advancing with Collaboration Partner, VolitionRX

Developing Proprietary Adoptive Cell Therapies Potentially Targeting Multiple Solid Cancer Types

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DNase I-Armored CAR T

Volition

Nu.Q® Technology

Expect Volition to fund research program and two parties to share proceeds from commercialization or licensing of any products arising from the collaboration

Intellectual Property and Exclusivity

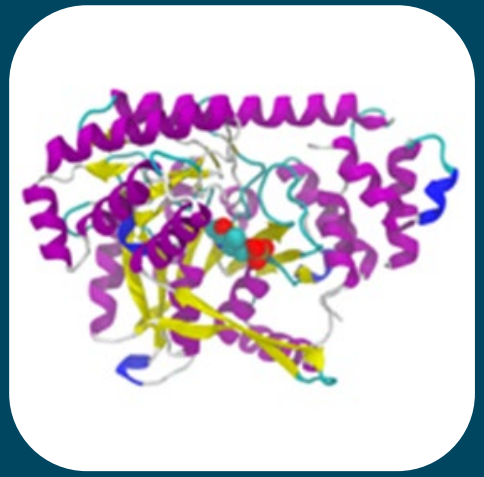
Systemic DNase I

IP Portfolio

Co-administration of Systemic DNase I with ICIs, Radiation, Chemo

Orphan Designation

DNase I for pancreatic cancer



DNase I-Armored CAR T

IP Portfolio

Co-administration of Systemic DNase I with CAR T

DNase I-secreting CAR T cells

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Team with Proven Expertise

Jeffrey F. Eisenberg
Chief Executive Officer & Director

Life Sciences executive with over 25 years of successful track record in value creation in both private and public companies; former CEO of Noven Pharmaceuticals, responsible for leading 2 product launches and Noven's Novogyne Women's Health joint venture with Novartis

Curtis Lockshin, Ph.D.
Chief Scientific Officer

25 years Biotech/Pharma management experience, including discovery, preclinical and clinical development and commercial manufacturing; former CEO of SciVac Therapeutics, CTO of VBI Vaccines and VP of Corporate R&D Initiatives for OPKO Health

James F. Parslow, MBA, CPA
Chief Financial Officer

Over 30 years of experience providing financial and business leadership to biotech, manufacturing, technology, business-to-business e-commerce and cleantech industries

Scott N. Cullison
Business Development

Over 20 years of experience in the pharmaceutical industry with a broad range of expertise across business development, alliance management, commercialization, product management, R&D program team leadership, and strategic planning.

Reid P. Bissonnette, Ph.D.
Translational Research and Development

Over 25 years of experience in small molecule drug discovery and development and biotherapeutics; well-established translational scientist, drug hunter and senior manager of Oncology and Inflammation drug R&D

Scientific Advisory Board

Dr. Jonathan Spicer

Associate Professor of Surgery at McGill University and Medical Director of the McGill University Health Center (MUHC) Thoracic Oncology Network; recognized as a leader in understanding how neutrophils impact cancer progression, in particular, the role of NETs in cancer biology

Dr. Matthew Frigault

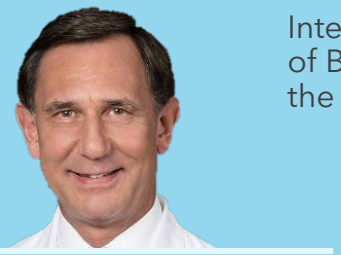
Medical Oncologist in the Hematologic Malignancy Program at the Massachusetts General Hospital Cancer Center, as well as Assistant Director of the Cellular Immunotherapy Program; serves as an Instructor at Harvard Medical School

Dr. Maksim Mamonkin

Assistant Professor, Pathology and Immunology and an independent faculty member at the Center for Cell and Gene Therapy at Baylor College of Medicine

Dr. Allan Tsung

Chair of the Department of Surgery at the University of Virginia School of Medicine and Director of the Cancer Therapeutics program at the University of Virginia Comprehensive Cancer Center; specializes in treating patients with liver, bile duct and pancreatic cancer



Dr. Guenther Koehne

Internationally recognized cancer specialist and current Chief of Blood & Marrow Transplant and Hematologic Oncology at the Miami Cancer Institute

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Key Upcoming Milestones

Assets

- ✓ IP supporting the use of DNase I in cancer
- ✓ IND-enabling GLP Tox studies in 2 species for systemic DNase I
- ✓ Cell line & established cGMP process and manufacturing

2022-2023 Activities

- ✓ Engaged Catalent, preeminent CDMO for clinical manufacturing
- Enhance preclinical data set
- Business Development
- Academic Collaborations

2024-2025 Activities

- Enhance preclinical data set
- Phase 1 study start
- Dose escalation and expansion data available

Investment Summary

Advancing Proprietary Technology Platform Aimed at Improving Immunotherapies by Targeting Neutrophil Extracellular Traps (NETs)

DNase I oncology platform has the potential to improve the efficacy of current cancer therapies

Initially targeting pancreatic carcinoma, a multi-billion-dollar indication with significant unmet need

Multiple key value-driving milestones expected over the next 12-24 months

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