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 may constitute forward-looking statements within the meaning of the federal securities laws. These statements can be identified by words such as “expects,” “plans,” “projects,” “will,” “may,” “anticipates,” “believes,” “should,” “intends,” “estimates,” and other words of similar meaning, including, but not limited to, all statements regarding: the transaction with CLS Therapeutics and the DNase platform, such as statements regarding the in-licensed DNase-based oncology platform providing opportunity to address multiple oncology indications, expectations regarding targeting an IND filing by the end of 2023 and all statements set forth under Planned Phase 1 Study, our belief that the systemic DNase program is initially targeting multi-billion-dollar indications including pancreatic carcinoma, our belief that pancreatic carcinoma represents an area of significant unmet need, and statements regarding key timeline drivers; our focus on advancing proprietary technology platforms across multiple high-value cancer indications; our expanded oncology pipeline; our potential for increased efficacy, safety and tolerability over currently approved CAR T therapies; our ability to address the CD19 escape phenomenon; and all statements regarding the Investment Summary section, including statements regarding the PolyXen® PSA technology platform enabling next generation biologic drugs; the potential utility in other molecule classes such as peptides and small molecules; our intentions to focus resources on advancing the DNase platform toward first-in-human study; statements regarding our expectations that the recent transaction will expand the pipeline into additional high-value oncology indications; expectations that X CART will continue to advance pre-clinical development plan toward IND-enabling studies; and statements regarding PolyXen’s growing royalty stream through license agreements.

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 such plans, estimates or expectations include, among others, (1) unexpected costs, charges or expenses resulting from the transaction with CLS Therapeutics and the acquisition of the DNase platform; (2) uncertainty of the expected financial performance of the Company following completion of the transaction with CLS Therapeutics and the acquisition of the DNase platform; (3) failure to realize the anticipated potential of the DNase platform or X CART or PolyXen technologies; (4) the ability of the Company to implement its business strategy; (5) failure of our licensees to successfully utilize the PolyXen technology and generate royalties for the Company; 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 pandemic, 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.

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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.
In-Licensed DNase Based Oncology Platform

Systemic Recombinant DNase I Enzyme | DNase-Armored CAR T

Transaction expands oncology pipeline and creates value-driving milestones with well-defined and accelerated path to clinic.
Focused on Advancing Proprietary Technology Platforms Across Multiple High-Value Cancer Indications

**DNase**

**Oncology Platform** aimed at improving immunotherapies by targeting Neutrophil Extracellular Traps (NETs)

**X-CART™**

**Personalized CAR T platform** targeting cancers with a patient- and tumor-specific approach
In-Licensed Platform to Expand Oncology Pipeline

**DNase**

- Exclusive license for systemic use of recombinant DNase enzymes for use in cancer
- Exclusive license for DNase-armored CAR T and co-administration of DNase together with CAR T for use in cancer

- Upfront payment of $500K and 875K shares
- Future development-based milestone payments
- Tiered royalties ranging from mid-single digits to low-double digits on any potential future sales
Intellectual Property and Exclusivity

**Systemic DNase**

**IP Portfolio:**
Co-administration of Systemic DNase with: ICIs; Radiation; Chemo

**Orphan Designation:**
DNase monotherapy for pancreatic cancer

**DNase-Armored CAR T**

**IP Portfolio:**
Coadministration of systemic DNase with CAR T
DNase-secreting CAR T cells
## Expanded Oncology Pipeline

In-Licensing of DNase Technology Provides Opportunity to Address Multiple Oncology Indications

<table>
<thead>
<tr>
<th>Technology</th>
<th>Indications</th>
<th>Preclinical</th>
<th>IND Enabling</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Highlights</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DNase</strong></td>
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<tr>
<td>Systemic DNase I (+ICIs)</td>
<td>Solid Tumors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Upcoming study to evaluate combination with ICIs or chemo</td>
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<tr>
<td>Systemic DNase I (+CAR T)</td>
<td>Solid Tumors</td>
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<td></td>
<td></td>
<td></td>
<td>Potential to enhance CAR T cell function in the tumor microenvironment</td>
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<tr>
<td>DNase-Armored CAR T</td>
<td>Solid Tumors</td>
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<tr>
<td><strong>XCAT</strong></td>
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<tr>
<td>Personalized CAR T</td>
<td>B-Cell Non-Hodgkin Lymphoma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Patient and tumor-specific cell therapy approach</td>
</tr>
</tbody>
</table>
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
Scientific Advisory Board

Dr. Allan Tsung
Currently serves as Director of Surgical Oncology at the Ohio State James Comprehensive Cancer Center and Co-Director of the Gastrointestinal Clinical Trials portfolio. Recently appointed as Chair of the Department of Surgery at the University of Virginia School of Medicine. Specializes in treating patients with liver, bile duct and pancreatic cancer.

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 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. Guenther Koehne
Internationally recognized cancer specialist and current Chief of Blood & Marrow Transplant and Hematologic Oncology at the Miami Cancer Institute
DNase Oncology Platform
Targeting NETs to Improve Cancer Therapies
Human Recombinant DNase I Enzyme

DNase-Armored CAR T Cells

Systemic Adjuvant to:
- Immune checkpoint inhibitors
- Chemotherapy
- Radiotherapy
- CAR T therapies

Adoptive Cell Therapy for Solid Cancers

Substantial Body of Published Proof-of-Concept Data
Neutrophil Extracellular Traps (NETs): Structure and Function

Inflammation
Pro-tumorigenic pathways
Coagulopathies

Innate immunity
Antimicrobial defense

“NETosis”

NET - cfDNA - proteins

Role of NETs in Cancer Progression

https://doi.org/10.1186/s13046-021-02013-6
DNase: Potential Therapeutic Modalities

Adapted from: Pancancer cytotoxic T-cell trapping: are neutrophil extracellular traps a viable biomarker for immunotherapy response. Lysanne Desharnais, Jonathan D Spicer. https://doi.org/10.1002/path.5844
Systemic DNase Treatment Improves Efficacy of PD-1 Blockade
Systemic DNase Treatment Improves Efficacy of PD-1 Blockade

DNase  Armored CAR T
## 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

### Current Industry Approaches
- Identify “better” tumor associated antigens (TAAs)
- Additional T-cell engineering or alternate cell types
- Next-generation CAR designs including “Armored” CARs
### DNase In Next-Generation “Armored” CARs

![Diagram of CAR-T cell components](image)

**Binding Domain**
- scFv
- Nanobodies (camelid V_{H}H domains)
- Cytokines
- Ligands
- Peptides (adnectins and DARPinns)

**Hinge**
- CD8
- CD28
- IgG1
- IG4

**Transmembrane Domains**
- CD3
- CD8α
- CD4
- CD28
- ICOS

**Co-Stimulation**
- CD28
- 4-1BB
- OX40
- ICOS
- CD27
- MYD88-CD40
- KIR2DS2

**Activation**
- CD3ζ

**Armor**
- Cytokines or chemokines
- Cytokines or chemokine receptors
- Ligands or receptors
- mAbs
- BiTEs
- scFv
- Peptide (IL-1Ra, off-switch receptors or inducible suicide construction)
- Enzymes

DNase Armored CAR T: Proof of Concept

HER2-targeting, DNase-armored CAR T cells:

**Secrete DNase**

DNase levels in culture media

**Retain Cytotoxic Function**

CTL assay (LDH), 27h

- DNase-armored anti-HER2 CAR T
- anti-HER2 CAR T
- Control CAR T

Target Cell Line: BT-474 (HER2+)

<table>
<thead>
<tr>
<th>E:T Ratio</th>
<th>Cytotoxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:1</td>
<td>10%</td>
</tr>
<tr>
<td>5:1</td>
<td>50%</td>
</tr>
</tbody>
</table>

- Target Cell Line: BT-474 (HER2+)
DNase
Advancing Toward First-In-Human Study
Planned Phase 1 Study

**Targeting IND Filing End of 2023**

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)
Systemic DNase Program Initially Targeting Multi-Billion-Dollar Indications Including Pancreatic Carcinoma

Pancreatic Carcinoma Represents an Area of Significant Unmet Need

~62,000 Diagnosed Annually\(^1\)
~50,000 Deaths Annually\(^1\)

5-year survival for advanced stage patients: ~3\%\(^1\)

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

## Systemic rhDNase I: Key Timeline Drivers

<table>
<thead>
<tr>
<th>Transaction</th>
<th>2022-2023 Activities</th>
<th>2024-2025 Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• IP supporting the use of DNase in cancer</td>
<td>• Pre-IND meeting</td>
<td>• Phase 1 study start and dose escalation data available</td>
</tr>
<tr>
<td>• IND-enabling GLP Tox studies in 2 species for systemic DNase</td>
<td>• Clinical batch manufacturing</td>
<td>• Dose expansion data available</td>
</tr>
<tr>
<td>• Cell line &amp; established cGMP process and manufacturing relationship with preeminent CDMO</td>
<td>• Potential additional Tox studies based on FDA feedback</td>
<td></td>
</tr>
</tbody>
</table>
X CART™ Platform

Personalized CAR T Platform Targeting Cancers with a Patient- and Tumor-Specific Approach
Only Targets Malignant B-Cells

Ability to address the CD19 escape phenomenon
Potential for increased efficacy, safety and tolerability over currently approved CAR T therapies

Unique BCR Presents Tumor-Specific Target

Normal B-Cell Not Targeted

Only Malignant B-Cells Eliminated

Normal B-Cells are Spared

Malignant B-Cell Targeted
CD19 Escape: Emergence of CD19⁻ Tumor Cells Resulting from Anti-CD19 Treatments, including CAR T

~50% of CAR T treated patients relapse within 12 months¹

~10-50% Estimated percentage of patients who relapse due to CD19 escape²

10-15% Of patients have a lower count of CD19-positive B-Cells due to prior therapies²

Incidence of CD19 escape is expected to increase with growing number of anti-CD19 treatments

1: Schuster SJ, et al. Presented at 60th American Society of Hematology Annual Meeting; December 1-4, 2018; San Diego, CA. Abstract 1684
2: Triangle Insights: Company Commissioned Market Report
PolyXen® PSA Technology Platform

Enables Next Generation Biologic Drugs
**PolyXen: Next Generation Half-Life Extension Platform Technology**

- Polysialylation employs the biological polymer polysialic acid (PSA) to modulate the PK and PD profiles of protein drugs.
- Clinically demonstrated to extend half-life of therapeutic proteins.
- Applicable to franchise extensions as well as candidates in development.
- Potential utility in other molecule classes such as peptides and small molecules.
- Generating Royalty Stream Platform for Partnerships Extensive IP Protection.
- Receiving royalties on net sales through licensing arrangement in the field of blood coagulation disorders.
- Partner filed registration dossier in Russia for Epolong, a polysialylated form of recombinant human erythropoietin as a treatment for anemia in patients with chronic kidney disease.
Financial Snapshot
NASDAQ: XBIO

1: As of March 31, 2022; 2: As of May 31, 2022; 3: As of May 6, 2022

- **Cash Balance**: ~$16.2M
- **Market Cap**: ~$11M
- **Shares Outstanding**: ~14.3M
- **Average Volume**: ~205K
Investment Summary

Focusing Resources on Advancing the DNase Platform Toward First-In-Human Study

<table>
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<tr>
<th>DNase</th>
<th>Recent transaction expands pipeline into additional high-value oncology indications</th>
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<td>X CART™</td>
<td>Continuing to advance pre-clinical development plan toward IND-enabling studies</td>
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<tr>
<td>PolyXen®</td>
<td>Growing royalty stream through license agreement</td>
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