



COMPANY OVERVIEW

eXoZymes is a Los Angeles, California-based biotechnology company that has developed a cell-free biomanufacturing platform combining AI-driven enzyme engineering with scalable, cell-free production systems. The company's technology is designed to overcome the fundamental limitations of traditional extraction, petrochemical synthesis, and cell-based synthetic biology by liberating enzymatic pathways from living cells and operating them in controlled industrial settings. This approach retains the precision and selectivity of biology while removing the constraints that have historically limited biomanufacturing at scale.

Originally spun out of UCLA in 2019, eXoZymes listed on Nasdaq in 2024 and has since narrowed its commercial focus to pharmaceutical and high-value nutraceutical markets. The company operates a capital-light, partnership-driven business model, applying its platform across multiple molecule programs while retaining control of underlying technology and intellectual property. Its lead program centers on N-trans-caffeoyltyramine (NCT), a rare plant-derived molecule with applications in both nutraceutical and pharmaceutical development. The company has demonstrated gram-scale production of NCT with over 99% purity, with technology validated through publications in Nature Communications and Nature Chemical Biology.

KEY CONSIDERATIONS

- **Cell-Free Production at Scale.** Cell-free biomanufacturing removes the biological constraints of living cells, enabling higher yields, higher purity, and more predictable scale-up than traditional fermentation-based synthetic biology
- **AI-Accelerated Development.** AI-powered enzyme engineering platform generates proprietary performance data through closed-loop design cycles, accelerating development timelines from years to months
- **Dual-Track NCT Program.** Lead molecule NCT is being developed on a dual track: near-term over-the-counter nutraceutical commercialization alongside longer-term pharmaceutical discovery including new-to-nature analogs
- **Partnership-Driven Business Model.** The company has a capital-light model structured around joint ventures, spinouts, and licensing arrangements, with partners contributing commercialization capabilities while eXoZymes retains platform IP
- **Multi-Molecule Pipeline.** Pipeline extends beyond NCT to include non-intoxicating cannabinoid-like molecules and santalene, each selected for limited natural availability and strong relevance to nutraceutical and pharmaceutical applications
- **Non-Dilutive Funding.** Technology has been supported by government grant funding, reducing reliance on shareholder dilution during early-stage development

NASDAQ: EXOZ

CELL-FREE BIOMANUFACTURING DESIGNED FOR SCALE

AI-engineered enzymes operating outside living cells, producing high-value molecules with engineering-level control

ELIMINATING THE CELL BOTTLENECK

Traditional synthetic biology forces enzymatic pathways to compete with cellular survival functions; eXoZymes removes the cell entirely, converting feedstocks directly into target molecules without metabolic interference.

AI-DRIVEN ENZYME DESIGN

Machine learning models predict which enzyme modifications will improve performance under production conditions, with high-throughput experimental validation generating proprietary datasets that strengthen predictive accuracy over time.

COMPRESSED DEVELOPMENT TIMELINES

Cell-free systems follow chemical engineering principles rather than variable biological behavior, enabling progression from proof of concept to kilogram-scale production in weeks or months rather than years.

NCT AS PLATFORM PROOF POINT

Gram-scale production of NCT at over 99% purity demonstrates the platform's ability to manufacture a complex natural product that is impractical to source through traditional extraction.

DUAL-TRACK COMMERCIALIZATION

NCT is being advanced simultaneously as a near-term nutraceutical product and a pharmaceutical discovery program, with production data and process optimization serving both paths.

BUILT FOR PARTNERING

Revenue opportunities span R&D fees, milestone payments, licensing income, royalties, equity stakes in spinouts, and enzyme supply, enabling value creation across multiple molecules without building large-scale manufacturing infrastructure.

A PLATFORM ENGINEERED TO SOLVE BIOMANUFACTURING'S STRUCTURAL LIMITATIONS

For decades, biomanufacturing has been constrained by a structural mismatch between the needs of living cells and the requirements of industrial production. Engineered cells divert feedstock into growth and maintenance, generate unwanted byproducts, and often become stressed when exposed to the very molecules they are designed to produce.

eXoZymes developed its cell-free approach by redesigning enzymes from first principles to function in controlled, industrial environments rather than inside living organisms. Engineered enzymes are assembled into defined reaction pathways that operate more like chemical processes than biological fermentation, with no energy diverted to cellular growth and no accumulation of toxic intermediates.

The company's AI-driven enzyme engineering platform integrates computational design with high-throughput experimental validation. Machine learning models predict which enzyme modifications are most likely to improve stability, substrate tolerance, and sustained activity under production conditions. Each experimental cycle generates performance data that feeds back into the models, creating a closed loop that accelerates convergence on production-ready enzymes.

NCT, the company's lead molecule program, demonstrates this approach in practice. A naturally occurring small molecule found only in trace quantities in certain plants, NCT has historically been impractical to produce at commercial scale. In a 100-liter pilot run, eXoZymes achieved 99% reaction conversion, 90% isolated yield, and 535 grams of NCT at 99.6% pharma-grade purity, with the process independently replicated by manufacturing partner Cayman Chemical in early 2026. The company is pursuing NCT on a dual track, with near-term nutraceutical commercialization alongside pharmaceutical analog development targeting metabolic and inflammatory pathways.

Beyond NCT, eXoZymes is applying the same platform to non-intoxicating cannabinoid-like molecules and santalene, each selected for limited natural availability and strong relevance to nutraceutical and pharmaceutical markets, demonstrating the platform's repeatability across different molecular classes.

100X

Scale-Up Achieved

99.6%

Pharma-Grade Purity

535

Grams NCT Pilot Output

90%

Isolated Yield (Process Efficiency)

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eXoZymes

LEADERSHIP

MICHAEL HELTZEN

CHIEF EXECUTIVE OFFICER

- LEADS CORPORATE STRATEGY, PARTNERSHIPS, AND COMMERCIAL EXECUTION AS EXOZYMES TRANSITIONS FROM PLATFORM DEVELOPMENT TO MARKET-FACING OPERATIONS
- BRINGS EXPERIENCE IN BUILDING AND SCALING TECHNOLOGY-DRIVEN BUSINESSES ACROSS MULTIPLE INDUSTRIES
- FOCUSED ON ADVANCING THE COMPANY'S PARTNERSHIP-DRIVEN BUSINESS MODEL AND CAPITAL-EFFICIENT GROWTH STRATEGY

DAMIEN PERRIMAN

CHIEF COMMERCIAL OFFICER

- OVERSEES COMMERCIALIZATION STRATEGY, PARTNER DEVELOPMENT, AND MARKET ENTRY ACROSS NUTRACEUTICAL AND PHARMACEUTICAL APPLICATIONS
- REPRESENTS THE COMPANY AT INDUSTRY EVENTS AND INVESTOR FORUMS, INCLUDING THE 2026 MISTA SYMPOSIUM HEALTHSPAN EVENT
- LEADS ENGAGEMENT WITH POTENTIAL LICENSING, JOINT VENTURE, AND SPINOUT PARTNERS

DR. TYLER KORMAN

CHIEF SCIENTIFIC OFFICER & CO-FOUNDER

- CO-INVENTOR OF EXOZYMES' CELL-FREE BIOMANUFACTURING PLATFORM, ORIGINALLY DEVELOPED AT UCLA
- LEADS ADVANCEMENT OF THE CORE TECHNOLOGY PLATFORM, INCLUDING ENZYME PATHWAY DESIGN AND OPTIMIZATION
- RESEARCH PUBLISHED IN NATURE COMMUNICATIONS AND NATURE CHEMICAL BIOLOGY VALIDATING THE CELL-FREE APPROACH

DR. PAUL OPGENORTH

VICE PRESIDENT OF DEVELOPMENT & CO-FOUNDER

- CO-INVENTOR OF THE PLATFORM ALONGSIDE DR. KORMAN, WITH DEEP EXPERTISE IN METABOLIC ENGINEERING AND CELL-FREE SYSTEMS
- OVERSEES DEVELOPMENT OPERATIONS, INCLUDING PROGRESSION FROM LABORATORY-SCALE RESULTS TO PILOT AND COMMERCIAL PRODUCTION
- INSTRUMENTAL IN ESTABLISHING THE AI-INTEGRATED ENZYME ENGINEERING WORKFLOWS THAT UNDERPIN THE COMPANY'S DEVELOPMENT CAPABILITIES