Richard P. Feynman Center for Innovation

Technology Snapshot

Technology Licensing Opportunity

Los Alamos NATIONAL LABORATORY

Clathrate Therapeutic Platform

Unlocking the clinical potential of therapeutic gases through targeted delivery and computational design

Value Proposition

The Clathrate Therapeutics Platform enables controlled, localized delivery of therapeutic gases — overcoming the systemic exposure and dosing precision barriers that have limited gas-based therapies in oncology, cardiovascular, neurological and regenerative medicine applications.

Technology Readiness Level 2

IP Information for S-195396

U.S. Patent pending

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Overview

This technology from scientists at Los Alamos National Laboratory represents a novel platform for improving the safety and effectiveness of therapeutic gas-based treatments by enabling controlled, localized delivery at the site of disease. By addressing longstanding challenges associated with systemic exposure and dosing precision, the platform enhances the clinical viability of gas therapies across high-value markets such as oncology, cardiovascular care and regenerative medicine. In addition, the inclusion of a complementary predictive modeling capability supports treatment optimization and development efficiency, reducing technical risk and accelerating translation. Together, these capabilities position the technology as a differentiated and scalable solution.

Advantages

- **Localized delivery:** Targets therapeutic gases to the intended site while minimizing systemic exposure.
- **Controlled release:** Designed for sustained, tunable dosing under physiological conditions.
- **Improved safety margin:** Aims to separate therapeutic effect from toxicity risk.
- **Platform versatility:** Applicable across oncology, cardiovascular, neurological and regenerative indications.
- **Development optimization:** Supported by predictive modeling to guide dose and design decisions.
- **Partnership-ready architecture:** Suitable for integration with drug-device combinations and existing treatment modalities.

Technology Description

Therapeutic gases have demonstrated meaningful biological effects across oncology, cardiovascular disease, neuroprotection and regenerative medicine, yet their clinical adoption has been limited by a fundamental challenge: safe, controlled and localized delivery. Existing approaches often result in rapid

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NNSA National Nuclear Security Administration

Technology Description continued

release, systemic exposure or narrow therapeutic windows, creating safety, regulatory and development barriers. The Clathrate Therapeutics Platform addresses this unmet need by positioning gas-based therapies as programmable, targetable and commercially viable treatment modalities. By enabling more precise control over where and how therapeutic gases are delivered, the platform has the potential to unlock new product categories, enhance combination treatment strategies and accelerate translation of gas-based therapeutics into high-value clinical markets.

The Clathrate Therapeutics Platform uses a proprietary, controlled-release system designed to localize therapeutic gases at the intended treatment site rather than allowing them to disperse systemically. This technology temporarily stabilizes the gas within a biocompatible structure that gradually releases it under physiological conditions, enabling sustained and targeted exposure. This controlled release approach is designed to support therapeutic concentrations where needed while limiting circulating levels elsewhere in the body. An integrated computational modeling capability further supports optimization of dosing profiles and treatment parameters, helping guide development decisions prior to in vivo studies

Market Applications

- Oncology Therapeutics Industry
- Cardiovascular and Vascular Medicine Industry
- Neurology and Neurodegenerative Disease Sector
- Regenerative Medicine and Tissue Engineering Industry
- Medical Device and Drug-Device Combination Companies
- Biotechnology and Specialty Pharma Companies
- Computational Drug Development and Modeling Firms