OncoNova Therapeutics

Overview

OncoNova Therapeutics is a Boston-based biotech developing a nanoparticle-based RNA delivery system for triple-negative breast cancer (TNBC) patients resistant to chemotherapy. Founded in 2023 by a team of RNA therapeutics experts, OncoNova emerged from research at MIT and Dana-Farber focused on overcoming drug resistance in aggressive cancers. The NovaSphere™ platform leverages decades of work in lipid nanoparticle chemistry and RNA interference, building on breakthroughs that enabled mRNA vaccines. This history underscores the robustness of the approach and its adaptability to oncology applications.

Problem

TNBC accounts for approximately 15% of breast cancers and has poor prognosis due to lack of targeted therapies. Chemotherapy resistance develops rapidly, leaving patients with limited treatment options and high mortality rates. Historically, TNBC has been challenging because it lacks hormone receptors and HER2 amplification, making conventional targeted therapies ineffective. Resistance mechanisms, such as upregulation of efflux pumps and DNA repair pathways, have been documented for decades, yet no approved solution exists.

Solution

NovaSphere™ delivers RNA payloads that knock down resistance pathways, restoring sensitivity to standard chemotherapy. The platform is modular and can be adapted for other solid tumors with similar resistance mechanisms. This concept builds on the success of RNA interference technologies pioneered in the early 2000s, which demonstrated the ability to silence disease-driving genes. OncoNova's innovation lies in its tumor-specific delivery system, which evolved from nanoparticle formulations used in infectious disease vaccines, now optimized for oncology.

Market

TNBC incidence: ~40,000 patients annually in the US; ~300,000 worldwide. Estimated addressable market: $4.5B annually for TNBC alone, with expansion potential into ovarian and lung cancers. Historically, oncology markets for high-unmet-need indications have seen rapid adoption of novel therapies, as evidenced by PARP inhibitors in BRCA-mutated cancers. The RNA therapeutics market is projected to exceed $25B by 2030, creating strong tailwinds for platforms like NovaSphere.

Clinical Need

Current TNBC treatments rely on chemotherapy and immunotherapy, but median survival remains less than 18 months for metastatic cases. No approved RNA-based therapies exist for this indication. The clinical community has long sought precision approaches for TNBC, as highlighted in numerous ASCO and ESMO reports over the past decade. NovaSphere addresses this gap by offering a targeted, resistance-reversing mechanism.

Competition

Existing players include Gilead (Trodelvy) and Immunomedics ADCs. RNA delivery competitors such as Alnylam and Moderna focus on other indications—none address TNBC resistance. Historically, ADCs have improved outcomes but face limitations in heterogeneity and resistance. NovaSphere's differentiation lies in its ability to modulate gene expression rather than rely solely on cytotoxic payloads, a paradigm shift in oncology.

Team

CEO: Dr. Priya Menon, PhD (RNA therapeutics expert, ex-Alnylam). CSO: Dr. James Liu, PhD (nanoparticle chemistry, MIT). Advisors: Dr. Susan Chang (Dana-Farber), Dr. Robert Klein (MD Anderson). The founding team combines decades of experience in RNA biology and drug delivery, supported by advisors who have shaped the field of precision oncology.

Capital Raised & Seeking

Raised: $1.2M (founders + NIH SBIR). Seeking: $6M Seed Round. Previous funding supported proof-of-concept studies and formulation optimization.

Use of Funds

Scale NovaSphere manufacturing, complete IND-enabling toxicology, initiate Phase I trial in TNBC patients. Funds will also support expansion of IP portfolio and strategic collaborations with leading cancer centers.

Timeline

18 months to IND submission, leveraging prior preclinical milestones and CRO partnerships.