

PRESS RELEASE

March 14, 2024

Ziccum inhalable mRNA/LNP project confirms excellent properties obtained by LaminarPace

Ziccum has generated very good findings in the first stages of its collaborative project to engineer inhalable mRNA/LNP together with the University of Copenhagen. The results demonstrate that LaminarPace successfully produces inhalable particles with special, desirable properties. The project will continue with in-vivo studies comparing inhalation versus injection.

Ziccum first announced the project on December 4, 2023. The two main objectives of the study are to engineer dry powder inhalable particles of mRNA/LNP materials that can be delivered to the lung and to correctly formulate the lipid nanoparticles carrying the mRNA materials so that they preserve activity, structure, and morphology without degrading. By demonstrating these achievements, Ziccum can build a strong case for partnering with pharmaceutical companies aiming to achieve inhalable drugs and vaccines, especially on the mRNA/LNP platform where new inhaled treatments will be a break-through.

The project is based on mRNA coding for the Covid spike protein that could be used in an inhalable mRNA vaccine. It will include immunological tests to ensure the same responses are achieved in an inhaled vaccine as with an injection. The next stage of in-vivo testing in the project is expected to begin in April / May 2024.

All results in first stages of project are positive

The positive findings relate to the particle morphology, cell borders and Mass Median Aerodynamic Diameter (MMAD). These are important metrics that describe the dry particle's ability to 'fly' as an aerosol. The results demonstrate that LaminarPace has successfully been able to produce inhalable particles with the correct MMAD and morphology.

To achieve inhalable mRNA treatments

Inhalable solid dosage forms of mRNA vaccines are of great interest to the biopharmaceutical industry. They promise increased storage stability compared to liquid formulations, simplified and preferred patient administration avoiding injections and an ability to stimulate the mucosal immune system. LaminarPace was originally developed for inhalation purposes. Inhalable mRNA /LNP therapies do not exist on the market today, as the elevated temperatures of conventional drying methods are not applicable for the highly delicate mRNA/LNP materials. Ziccum's technology LaminarPace is applied at room temperature with minimal stress factors, enabling a very gentle treatment compared to other methods.

Ziccum CEO Ann Gidner: "The project is making very nice progress, and this will be of great value for Ziccum in the inhalation field in industry. We are confirming very important particle properties here. We are excited to keep up the intensive data generation here, for external partners and in our internal mRNA/LNP projects".

For more information about Ziccum, please contact:

Ann Gidner,
CEO Ziccum
Mail: gidner@ziccum.com
Mobile: +46 722140141

Fredrik Sjövall,
Chairman of the Board, Ziccum AB
Mail: sjovall@ziccum.com
Mobile: +46 706 45 08 75

Ziccum's Certified Adviser is
Carnegie Investment Bank AB (publ).
Follow us on <https://eucaps.com/ziccum>

About Ziccum

Ziccum is developing LaminarPaceTM, a unique drying method for biopharmaceuticals and vaccines based on mass transfer, not heat transfer. The technology is offered by licensing to vaccine and biologics developers and manufacturers in the global pharmaceutical industry. By reducing drying stress to the active ingredient, LaminarPaceTM uniquely enables particle-engineered, thermostable dry powder biopharmaceuticals which can be easily handled and transported and are highly suitable for novel administration routes. The technology has been successfully applied to mRNA, peptides, proteins, antibodies, lipids and enzymes as well as excipients and adjuvants, and is well suited for industrial application. Ziccum is listed on the Nasdaq First North Growth Market.

About the mRNA field

The new mRNA technology, first implemented in the Covid mass vaccinations, has become a game-changer in pharmaceutical development, generating multi-billion-dollar development efforts all over the global industry. Solving stability limitations and delivery challenges, as mRNA in LNP formulation is a very complex and delicate structure, would enable a cornerstone treatment across new indications, also targeting so called undruggable genes. A market forecast predicts the mRNA domain to grow to 59 BUSD by 2031 (1). However, existing methods for treatment, formulation or drying do not solve the limitations regarding stability nor fragility, and options for delivery are limited to injection currently. (1) Straits Research, June 08, 2023

Attachments

[Ziccum inhalable mRNA/LNP project confirms excellent properties obtained by LaminarPace](#)
