

InhaTarget

INNOVATIVE FORMULATIONS FOR INHALATION TO IMPROVE THERAPEUTIC OUTCOMES OF LUNG TUMORS

KEYWORDS

- Pulmonary drug delivery
- Aerosolized chemotherapy
- Targeted therapy
- Nanomedicine
- Controlled-release
- Prolonged lung retention
- Lung cancer

Collaboration type

Partnership
Research collaboration
License agreement

IP Status

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STATE OF THE ART

Lung cancer is the world's leading cause of death cancer - a sign of the difficulty of treating it. Aerosolized chemotherapy is an interesting alternative to conventional adjuvant chemotherapy, which is currently administered through the intravenous route, as it decreases severe systemic toxicities and increases anti-tumor efficacy. However, despite interesting clinical trial reports, all the strategies describing an aerosolized chemotherapy have failed to bring a new medicine onto the market so far.

Over more than 15 years, our research team has developed expertise in pulmonary drug delivery, especially in dry powders for inhalation (DPI). We have applied for a patent describing a technology that brings solutions to the main causes of failure that are observed during clinical trials.

R&D STRATEGY

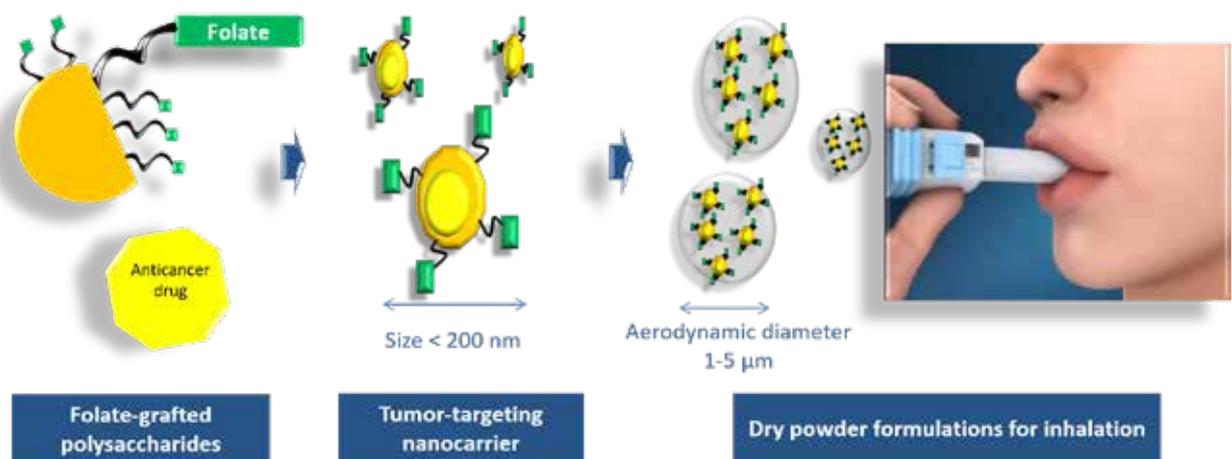
Our R&D program involves the development of anticancer DPI formulations characterized by controlled drug release and prolonged retention within the lungs (e.g. cisplatin and paclitaxel-based DPI).

In addition, the "lung cancer cell targeting" technology, includes dry powder formulations that potentiate conventional chemotherapy by means of a dual-targeting approach, i.e. the targeting of lung tumor site(s) through pulmonary delivery, and of lung cancer cells through targeted nanocarriers (targeting the folate receptors overexpressed by 30-50% of tumors in lung cancer patients).

KEY ADVANTAGES OF OUR STRATEGY

- Higher drug dose delivered directly to lung tumor sites
- Sharp decrease in systemic distribution and toxicity
- Controlled drug release and prolonged retention within the lungs
- Dual cancer targeting approach through pulmonary delivery and targeted nanocarriers
- Relatively good pulmonary tolerance of the treatment
- Short time of administration and negligible environmental contamination by the aerosolized drug during administration

Lung cancer cell targeting technology



TEAM

Over more than 15 years, the Laboratory of Pharmaceutics and Biopharmaceutics (ULB, Brussels, Belgium) has developed expertise in pulmonary drug delivery, especially in DPI.

The Laboratory is well-equipped to ensure development for lung drug delivery ranging from in vitro evaluation, through to evaluation of new excipients and devices, particle engineering and production using novel processes, aerosol formulation, scintigraphy imaging of lung deposition, and evaluation of local and systemic drug bioavailability and clinical outcomes.

Through our close collaboration with pharmaceutical industries and medical specialists (pulmonologists, oncologists), the Laboratory has been involved in four main clinical trials with four scaling-up studies of pulmonary drug formulation and has recently initiated the marketing of a new inhalation product (Braltus®, tiotropium DPI) as inventor. Consequently, the Laboratory can identify niche research domains and products with a high added value in inhalation.

APPLICATION

With the development of InhaTarget's technology/product, we aim to connect the DPI market with the lung cancer chemotherapy market > *Creation of a promising new market*

Our strategy allows the patent life of anticancer compounds that have fallen in the public domain but are still widely used in lung cancer to be prolonged by developing new innovative DPI formulations > *Cost reduction in IP*

The efficacy and systemic toxicity profile of the anticancer drugs used in the treatments are already known > *Cost reduction in clinical trials*

Our spin-off company will offer to pharmaceutical industries a rapid development of new inhaled therapies requiring a specific and high level of knowledge > *Time reduction in early R&D*

Lung cancer is the deadliest cancer in the world (1.6 million deaths each year) > *Cost reduction in clinical trials (fast-track procedure).*

RELEVANT PUBLICATIONS

> **Development and evaluation of well-tolerated and tumor-penetrating polymeric micelle-based dry powders for inhaled anti-cancer chemotherapy**, Rosière R., Van Woensel M., Mathieu V., Langer I., Mathivet T., Vermeersh M., Amighi K. and Wauthoz N., *Int J Pharm* 501 (2016) 148-159

> **Platinum pharmacokinetics in mice following inhalation of cisplatin dry powders with different release and lung retention properties**, Levet V., Merlos R., Rosière R., Amighi K., Wauthoz N., *Int J Pharm* 517 (2017) 359-372



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