

# LIPOSOMAL FORMULATION OF TIROSIN KINASE INHIBITORS FOR THE TREATMENT OF FIBROGENIC LUNG DISORDERS

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#### Applications:

- Pulmonary disorders (pulmonary fibrosis with inflammatory/autoimmune background).
- Bronchiolitis obliterans.
- Pulmonary hypertension.



#### Key benefits:

- aerosol administration of liposomes are biocompatible and biodegradable.
- liposomes increase the presence of drug in the deep lung reducing systemic absorption.
- liposomes allow the release of the drug over time and in a controlled manner.
- liposomes target fibrogenic cells of interest



#### Offer:

- Licensing out.
- Co-Development.

# TTO4IRCCS

## LICENSING OPPORTUNITIES



### LIPOSOMAL FORMULATION OF TIROSIN KINASE INHIBITORS FOR THE TREATMENT OF FIBROGENIC LUNG DISORDERS.

#### INVENTION

Liposomes targeted to specific disease cells (Macrophages and myofibroblasts) and loaded with a tyrosine kinase inhibitor drug to be delivered by Inhalatory route.

#### BACKGROUND

This patented technology will address an unmet therapeutic need for the treatment of fibrogenic pulmonary disorders, in particular when an inflammatory/autoimmune background is present (pulmonary fibrosis associated to collagen tissue diseases, idiopathic lung fibrosis and bronchiolitis obliterans which may occur as a phenotype of chronic lung rejection or as a consequence of graft versus host disease following bone marrow transplantation). At present, there are scarce therapeutic options, that, at best, slower the progression of lung function decline with associated consistent systemic toxicity. Our approach is related to the delivery of specific drugs by inhalatory route that allows to limit systemic toxicity. Our system is targeted: the drug preferentially enters and exerts its activity in specific disease effector cells: myofibroblasts and macrophages.

#### TECHNOLOGY

Here follows the innovative features of this technology:

- 1) the applicability of an inhaled liposomal formulation for fibrotic disorders, lung fibrosis associated to collagen pathologies and bronchiolitis obliterans, two rare chronic and progressive respiratory pathologies for which a well tolerated pharmacological approach does not yet exist.
- 2) The functionalization of liposomes with HA to direct therapeutic action preferentially towards myofibroblasts (CD44 +) and inflammatory cells (in particular alveolar macrophages).
- 3) Administration of tyrosine kinase inhibitor by inhalation.
- 4) The encapsulation method of tyrosine kinase inhibitor in liposomes
- 5) The use of a conjugate with HA with a specific molecular weight of this type of approach represents an absolute innovation together with a new promising perspective for patients affected by these diseases.

By means of this approach we gained significant results both in vitro (on primary cells obtained by patients) and in vivo (specific animal models of disease).

#### INVENTORS

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#### INTELLECTUAL PROPERTY RIGHTS

Patent application filed in Italy.

#### OFFER

Licensing out & co-development.

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