

Inmunotek S.L.

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The next generation of allergy vaccines targeting dendritic cells

Inmunotek has brought a range of skills and scientific specialties together to create a vaccine-based approach for the treatment of allergies and other immune-based diseases.

Madrid-based Inmunotek focuses on the research, development, manufacturing and marketing of allergy and clinical immunology medicinal products. In pursuing this focus, Inmunotek has built up a portfolio of therapeutic vaccines, diagnostics, nasal irrigation products and skin prick test recording systems, as well as a global operation to support them.

"While the company is based in Spain, we have sales offices and subsidiaries in Portugal and in Spanish-speaking countries in Latin America. We also have distribution and contract manufacturing partners around the world," said Miguel Casanovas, medical director at Inmunotek.

This approach has enabled Inmunotek to grow quickly. Sales at Inmunotek are growing at a steady rate of around 25%, resulting in the inclusion of the company in the *Financial Times*' list of the 1,000 fastest-growing companies in Europe in 2017.

Inmunotek is investing to fuel future growth. A large percentage of the company's income is reinvested into research and development programs that span allergy vaccines, mucosal vaccines to prevent recurrent infections, vaccine adjuvants and antitumor vaccines. Inmunotek has particularly high hopes for one avenue of research.

"We are very excited about our development of a pipeline of novel vaccines for allergen immunotherapy," said Casanovas.

Developing novel allergy vaccines targeting dendritic cells

The prevalence of rhinitis, asthma and other diseases triggered by allergens—substances that cause allergic reactions—has increased rapidly over the past 50 years, with such conditions affecting more than 30% of people in many countries.

Allergen immunotherapy can cure these diseases, but current vaccines have some limitations. There is scope to improve on the safety, efficacy and, in particular, convenience of these treatments, which require patients to receive frequent injections over a long period of time. Inmunotek thinks its vaccines may provide a better treatment alternative for allergies.

"Over the last 10 years, we have been working to develop novel allergen preparations that overcome such inconveniences," said Enrique Fernández-Caldas, scientific director at Inmunotek.

This work led to the development of neoglycoconjugates that are made up of polymerized allergens—known as allergoids—and nonoxidized mannan derived from *Saccharomyces cerevisiae*.

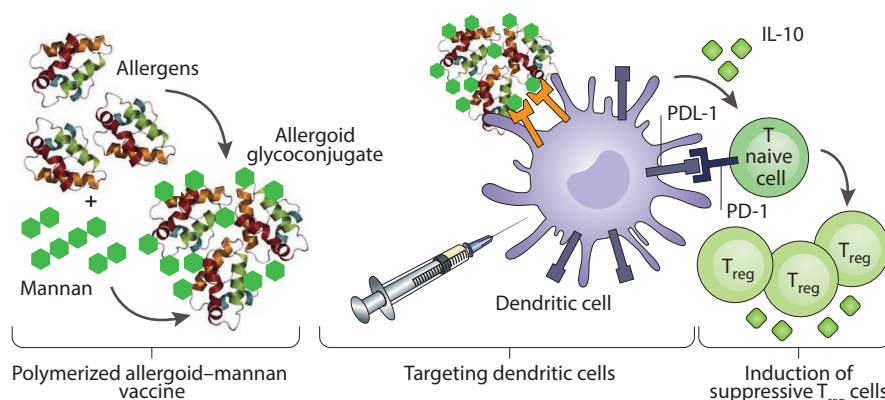


Fig. 1 | Novel vaccines targeting dendritic cells to improve allergen immunotherapy. PD-1, programmed cell death protein; PDL-1, programmed cell death ligand-1.

Inmunotek's approach maintains the integrity of the carbohydrate backbone, enabling the complex to interact with key receptors on dendritic cells (DCs) (Fig. 1).

"DCs are very important in the context of allergen immunotherapy because they are responsible for taking up the allergen, activating T cells and modulating their response," said Fernández-Caldas.

Inmunotek has put its vaccine candidates through proof-of-concept and preclinical studies, generating data that suggest they are more efficacious, less allergenic and, by extension, more convenient than conventional allergen immunotherapies.

We are looking for global or local pharma partners with experience in the field of allergy and immunology

Miguel Casanovas, Medical Director

"The results of a recent study in dogs with atopic dermatitis, a type of allergy, using mite allergoids conjugated to mannan were very encouraging, and a clear clinical improvement was observed in a short period of time," said Casanovas.

Those results positioned Inmunotek to advance a pipeline of subcutaneous and sublingual vaccines that work better than conventional vaccines in animal models. Inmunotek is now validating these findings in humans in phase 2 trials.

"Two dose-finding studies, for grass pollen and mites, performed in Spain, will be finished in 2019, and a new study will be initiated soon in Germany for birch pollen," said Casanovas.

Looking for partners

Inmunotek owns these novel allergen vaccines that will address the growing need for better safety, efficacy and faster-acting treatments of allergic conditions, such as allergic rhinoconjunctivitis and asthma.

Recognizing the potential of its pipeline, Inmunotek has secured patent protection in the United States and Japan, and is working through the application process in other countries. The patents and early-stage data have given Inmunotek the confidence to start working on a comprehensive clinical program designed to bring its candidate vaccines to market in key territories. Inmunotek is seeking partners to support these activities.

"We are looking for global or local pharma partners with experience in the field of allergy and immunology who are interested in collaborating with Inmunotek in the clinical development, especially in the US and Japan, for further distribution and/or licensing agreements. We look forward to making connections with potential partners," said Casanovas.

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