Emeritus Prof. Teresinha Leal and Prof. Sophie Gohy (PI, Pneumology, ENT and Dermatology Unit (PNEU) are both members of the Institute for Experimental and Clinical Research (IREC) at UCLouvain. They have joined hands to advance translational research in the field of cystic fibrosis (CF) and other respiratory diseases. They present their expertise, their research and the challenges they face.

Teresinha Leal's scientific career and research focus

Teresinha Leal has built her scientific career on clinical and translational experimentation for better understanding the pathophysiology of CF and for diagnostic purposes. Sophie Gohy holds a thesis on the respiratory epithelium in chronic obstructive pulmonary disease in the laboratory of Prof. Pilette (PNEU Unit). She currently leads the reference centre of the Cliniques Universitaires Saint-Luc and actively participates in the research of the pulmonology laboratory thanks to a mandate as a post-doctoral clinician researcher of the FNRS.

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Collaboration and joint research projects

The collaboration of the two researchers takes different forms. Sophie Gohy has entrusted Teresinha Leal with the supervision of one of her doctoral students and has taken over the translational research projects launched at the time of her emeritus. Teresinha Leal's main ongoing project consists in developing a new mouse model of CF that better mimics the CF respiratory disease by silencing the mouse CFTR protein and expressing the human mutated CFTR protein into the animal. "We are in the final stage of characterising the phenotype," explains Teresinha Leal. "For the first time we will have an animal model expressing a CF respiratory phenotype."

"Another ongoing project deals with the development of a nanomedicine to treat the

respiratory disease of patients irrespective of the type of CFTR mutation they display" she states.

Parallel research and collaborations

In parallel, Sophie Gohy is involved in a project to characterise the respiratory epithelium in CF and to study immunoglobulin A-related immunity in the respiratory mucosa. Both researchers have built a network of national and European collaborations: Sophie Gohy works closely with the reference centre for CF at the Cochin Hospital in Paris, France (leaded by Prof. P.R. Burger), while Teresinha Leal worked with two professors from the KULeuven to develop the respiratory phenotype of her mouse model (Profs. G. Vande Velde and J. Vanoirbeek).

Clinical research and therapeutic advances

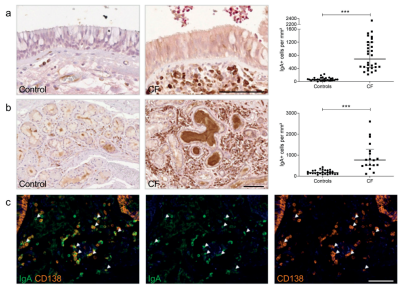
Sophie Gohy's clinical research aims at leading to significant therapeutic advances: several recently developed molecules are the subject of multi-centre studies funded by the pharmaceutical industry. "Clinical studies give patients access to very expensive molecules that will increase their survival," she says. Initial feedback from patients has been very positive, with a reduction in exacerbations, hospitalisations and referrals for lung transplantation. A new cohort of patients should be recruited in 2022.

Innovative diagnostic methods

Equally important, Teresinha Leal has developed a non-invasive diagnostic method for CF: the "bubble test". Multiple intradermal injections to stimulate cholinergic (phase C) or ß-adrenergic (phase B) sweat secretion have been replaced by a needle-free method making the test applicable to small children. The parameters measured during the test can be explored as biomarkers of efficacy of CFTR modulating treatments.

Ongoing challenges and future perspectives

A challenge remains: to better understand why some patients respond very clearly to treatment and others less so. Stimulating avenues of research remains essential to improve the quality of life and survival of patients.



© PNEU - UCLouvain - Patients with CF display increased IgA+ cells number. (a) IgA staining in the subepithelial area from one representative control and one representative patient with CF and number of IgA+ cells in the subepithelial area from 30 patients with CF, as compared with 30 controls. (b) IgA staining in the glandular area from one representative control and from one representative patient with CF and number of IgA+ cells in the glandular area from 18 patients with CF, as compared with 27 controls. (c) Identification of plasma cells (CD138+ cells (orange)) producing IgA (green; arrows) in the subepithelial area from one patient with CF. Bars indicate median and interquartile ranges.

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