IT-DED³ receives funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 765608

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Dry Eye Disease (DED)

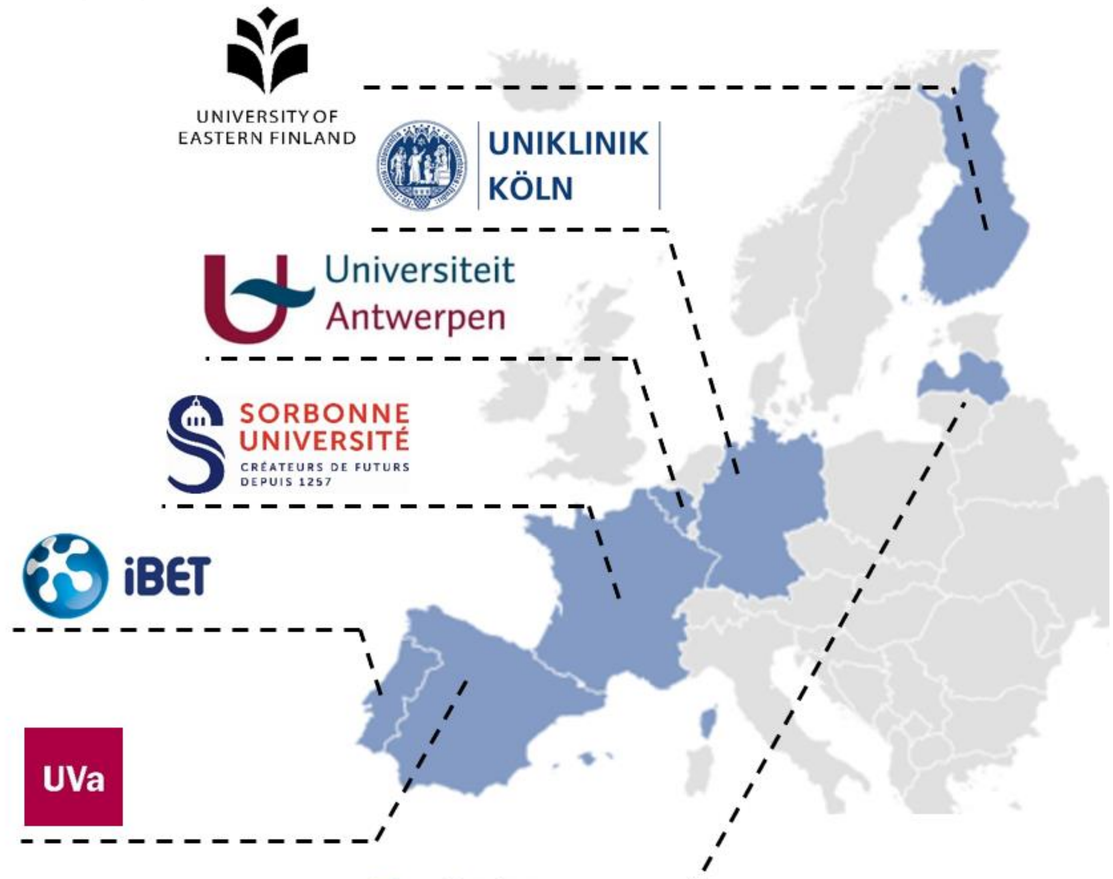
Dry Eye Disease (DED) is a major and increasing health-care problem due to its high prevalence and economic burden. Prevalence data reveals that 5 to 35% of the world adult's population suffer from DED. This disease is more common in an older population and is three times more frequent in women (7.8% in women older than 49 *versus* 2.3% in males). As people are living longer, these disorders are becoming more prevalent. However, experts expect that the prevalence in the younger population will increase due to frequent computer/tablet screen usage, environmental factors and wearing of contact lenses.

Objective

The main objective of IT-DED³ is to deliver entrepreneurial and innovative researchers able to face future challenges and to convert new ideas into therapeutic products for DED, generating both social and economic benefits. This is possible through the integration of expertise in medicinal chemistry, process chemistry, ocular drug delivery and formulation, ocular biology, *in vitro* and *in vivo* evaluation and imaging, biomarker research and clinical ophthalmology.

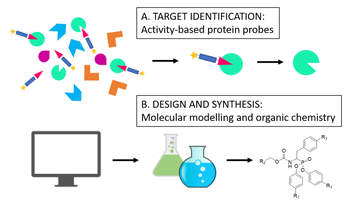
IT-DED³ consortium

IT-DED³ is composed of 7 beneficiaries and 9 partners from 8 different European countries. IT-DED³ constitutes a unique platform for a true translational research dedicated to patients suffering from DED and is able to translate basic research into patient applications ('bench-to-bedside' principle).



Research Projects

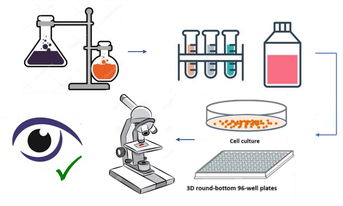
Design, Synthesis and Biochemical evaluation of novel serine protease inhibitors



Summary of the project: A. Target identification; B. Design and synthesis of new compounds

ESR1 Alba Ramos-Llorca — Universiteit Antwerpen

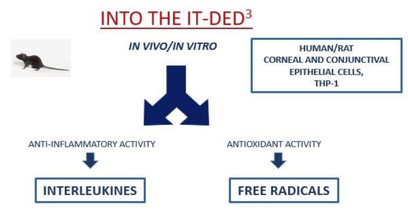
Design, Synthesis and Biochemical evaluation of novel RIPK1 inhibitors



Synthesis, analysis and biological screening of new dry eye inhibitors

ESR2 Camilla Scarpellini — Universiteit Antwerpen

Implementation of in vivo models to identify potential candidates for DED treatment



In vivo and in vitro summary of the PhD project

ESR3 Agnese Compagnone — Universiteit Antwerpen

Valorisation of natural compounds and their evaluation as therapeutic agents for ocular surface inflammatory diseases

Optimisation of the extraction and purification of potent extracts from agro-industrial residues and their evaluation as therapeutic agents *in vitro* (ocular surface cells) and *in vivo* (mouse dry eye model)

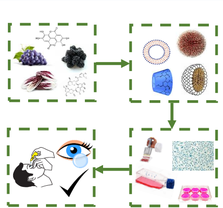
ESR4 Nikolaos Katsinas — UVa

Upscaling of lead compounds from WP1 and enantioselective synthesis of the serine protease inhibitor UAMC-00050

Synthesis of the two enantiomers using a kilo laboratory reactor

ESR5 Davide Ceradini — Latvian Institute of Organic Synthesis

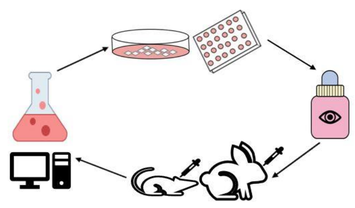
Development of new carriers to improve the bioavailability of topic formulations to treat ocular surface inflammatory diseases



Formulation of natural occurring compounds in different drug delivery systems with the aim to develop an efficient treatment for ocular surface disorders

ESR6 Luna Krstić — UVa

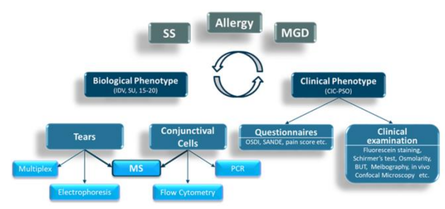
Drug penetration to ocular surface tissues



Characterization and *in vitro* testing of novel compounds, development and *in vivo* analysis of novel formulation

ESR7 Anusha Balla — University of Eastern Finland

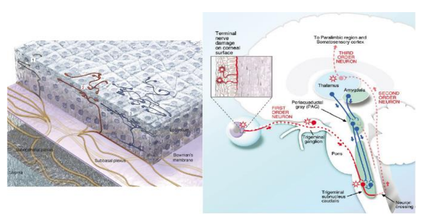
Development of new biomarkers for Dry Eye Disease



PhD project plan: correlation of clinical and biological phenotyping to discover disease-specific protein biomarkers

ESR8 Ioannis Kolman — Sorbonne Université

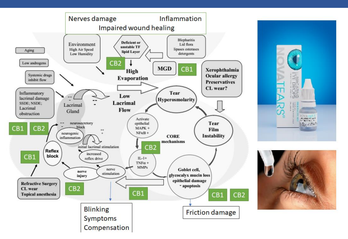
The nociceptive pathway in dry eye disease and ocular surface pain models



Corneal nociceptive pathway. From Rosenthal & Borsook, 2012 and Belmonte *et al.*, 2017

ESR 9 Adrián Guerrero-Moreno — Sorbonne Université

Dry eye therapy using cannabinoid ligands in a water-free delivery platform



Left: Vicious cycle of DED with Cnr expression (adapted from Baudouin et al. 2015), & Right: Novatears® (Novaliq GmbH)

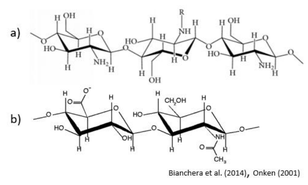
ESR10 Bao Tran Ngoc — Uniklinik Köln

Development of novel diagnostic tools for dry-eye disease using optical coherence tomography (OCT) and confocal microscopy

Left: HSM and Telesto (high resolution OCT & fluorescence imaging), Right-top: HRA-OCT (clinical retinal OCT), Right-bottom: Animal holder

ESR11 Md Asif Khan Setu — Uniklinik Köln

Extraction of hyaluronic acid and chondroitin sulfate from marine biomass and their evaluation as bioactive polymers in ocular carrier formulation



Bianchera et al. (2014), Onken (2001)

Chemical Structure of a) Chondroitin Sulfate (R=H or $COCH_3$), b) Hyaluronic acid

ESR12 Maha Abdallah — iBET