

Train2Target

An integrated multidisciplinary approach towards a new generation of antibiotics: Targeting function and cross-talk of bacterial envelope protein machineries

Background

Infectious diseases are still among the top ten causes of death worldwide. The European Commission and health agencies have drawn the attention to Antimicrobial Resistance (AMR) as a serious issue and a global threat to public health that impacts tremendously on healthcare expenses and productivity losses.

The most relevant factor accounting for the high incidence of infectious diseases and notably AMR is the spread of strains resistant to multiple drugs (MDR), which is leaving clinicians with very limited options to treat certain infection. This is especially serious for Gram-negative pathogens since they are intrinsically resistant to many antibiotics due to their complex cell envelope. Hence, the bacterial cell envelope has been and still remains one of the best targets for antimicrobials development.

This so-called “antibiotic resistance crisis” has been enhanced by a lack of antibacterials discovery and development programmes.

For a successful antibacterial drug development programme a detailed understanding of envelope structure and biogenesis is required.

Objectives

The overarching aim of the Train2Target programme is to deliver leads for a new generation of innovative antibacterials to treat infections by multi-drug resistant pathogens. This will be achieved by exploiting the mechanisms that govern the growth of the outer membrane (OM) and a thin peptidoglycan (PG) layers and their coordination to highlight novel targets for antimicrobial discovery.

More particularly, the Train2Target network will train 15 Early Stage Researchers (ESRs) in all scientific and non-scientific aspects related to the drug discovery process, including the following:

- Dissecting at the molecular level the function of the core envelope machineries;
- Investigating how the activities of envelope machineries are orchestrated and coordinated with PG synthetic machineries elongasome and divisome to ensure appropriate growth of the envelope layers during the cell cycle;
- Developing innovative screening strategies/ technologies to identify molecules inhibiting envelope biogenesis.

Funding Programme:

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Project Duration:

01/01/2017 – 31/12/2020

Project Budget:

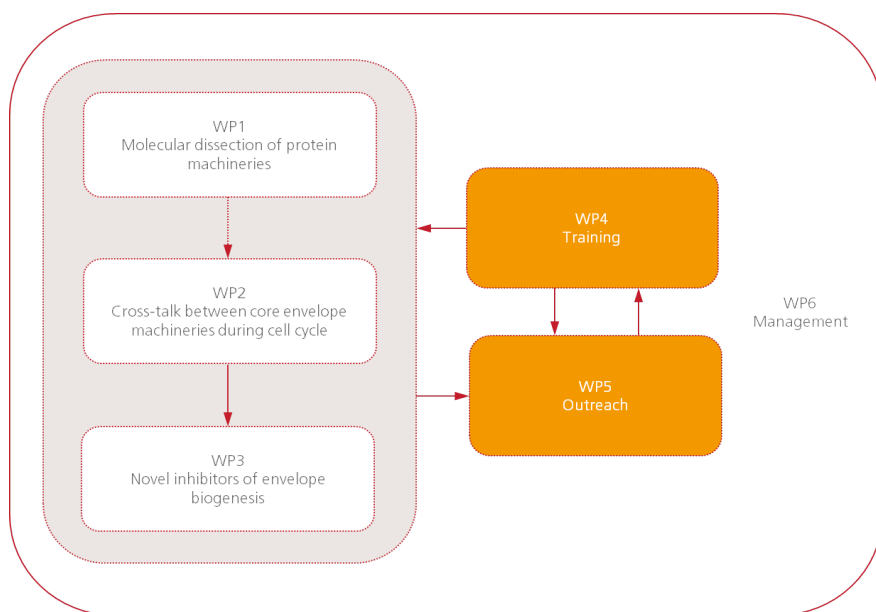
3.6 million euro

Project Website:

www.train2target.eu

Activities

The Train2Target research programme is based on three scientific work packages (WPs) and another three WPs dedicated to the training, the dissemination and management of the research results:



Each of the 15 Early Stage Researchers (ESRs) will focus on the research within one of these WPs while getting an insight into the other WPs as part of the network-wide scientific training workshops. The academic and the industry partners will contribute equally to the development of the research plan and to its excellence. The fellows will benefit of the complementarity of the industrial and academic skills and know-how in both the research and training activities.

Train2Target employs a unique and integrated approach to comprehensively understand the way core envelope machineries function and are regulated to build the bacterial cell envelope.

Impact

With the discovery of antibiotics, widespread deadly illnesses and infections could be easily cured. However, today antibiotics are not as effective anymore, because AMR has increased exponentially. Train2Target proposes a novel approach to tackling AMR and delivering new leads based on the high interest and potential of our biotech and pharma partners.

Europe's society and economy urgently require solutions to combat AMR in the long term. With specialised training, curiosity and forward thinking partners, Train2Target is well positioned to promote innovation in antimicrobial research and products.

Project Coordinator:

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Project Partners:

- accelopment AG (subcontractor)
- AiCuris GmbH
- AntibioTx Aps
- BioVersys AG
- Centre Nationale de la Recherche Scientifique
- Naicons Srl
- Newcastle University upon Tyne
- Université catholique de Louvain
- Università degli Studi di Milano
- Università degli Studi di Napoli Federico II
- University of Birmingham
- Universiteit van Amsterdam