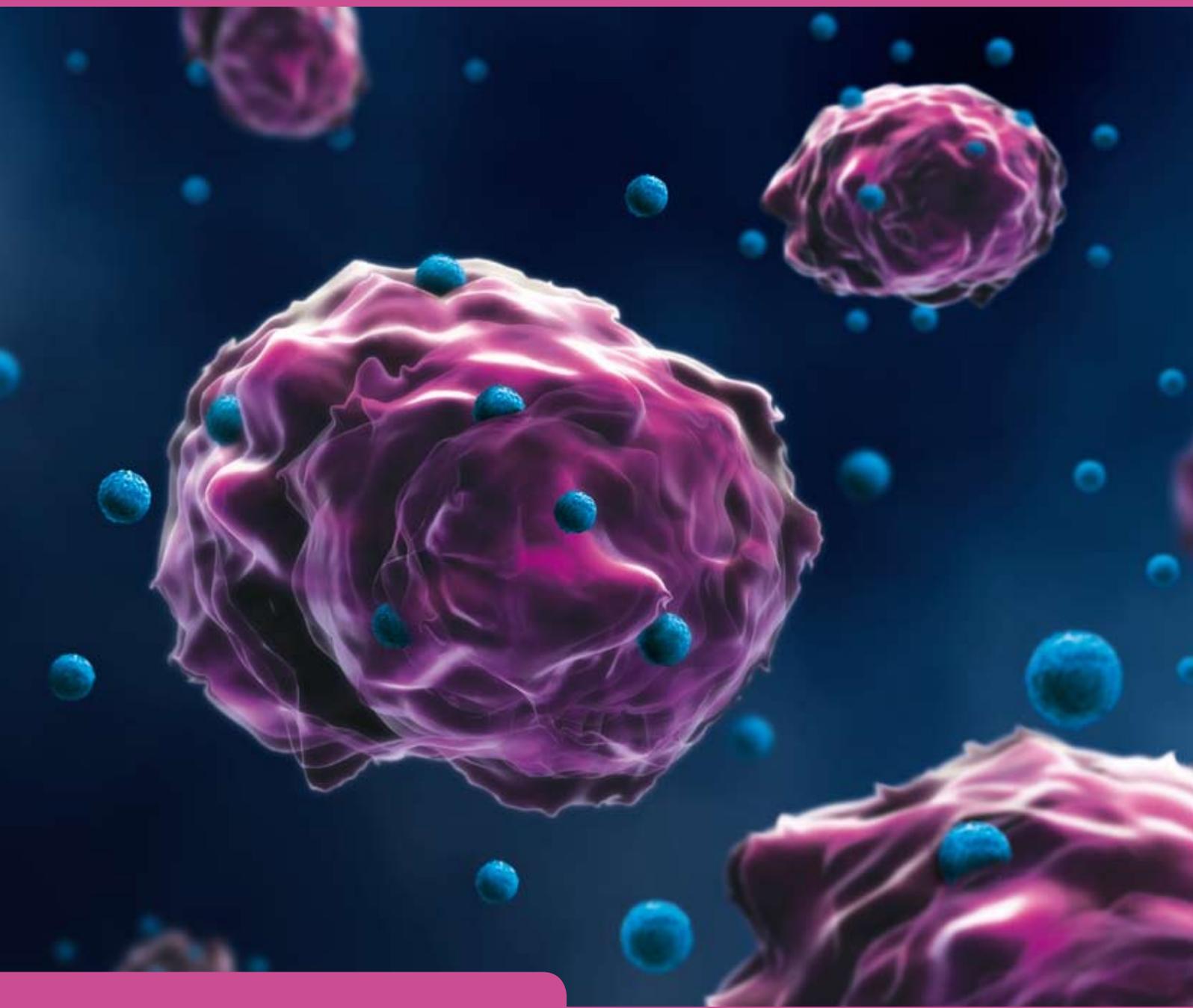




NANOFOL
diagnosis/therapy nanobiodevice



Folate-based nanobiodevices for integrated diagnosis/therapy targeting chronic inflammatory diseases



A European Large-Scale Project supported through the Seventh Framework Programme for Research and Technological Development





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diagnosis/therapy nanobiodevice

Context

It is estimated that **inflammatory diseases** affect more than **80 million people** worldwide leading to **untold suffering, economic loss and premature death**. Considering life expectancy in Europe, these **numbers are expected to increase** in the next 20 years. Moreover, studies have shown that disorders such as **rheumatoid arthritis (RA)** can **shorten life span** by 10 years.

The treatment of chronic inflammatory disorders, including RA, remains a challenge for the medical and scientific community. The emergence of new drugs creates new options though it also entails **high costs, complicated drug administration, allergic reactions** and potentially **fatal side effects**.

Therefore more efficient strategies have to be identified in order to **improve inflammatory disease treatment** while **decreasing the side effects** with an **improved cost-benefit ratio**.

Nano-enabled drug delivery systems will take therapy of chronic inflammatory disorders to a new level by creating a new, highly specific and efficient strategy, with reduced treatment costs.



Investigation on new therapeutic agents for chronic inflammatory diseases

NANOFOL concept for nano drug delivery in activated macrophages promoting inflammatory disorders treatment

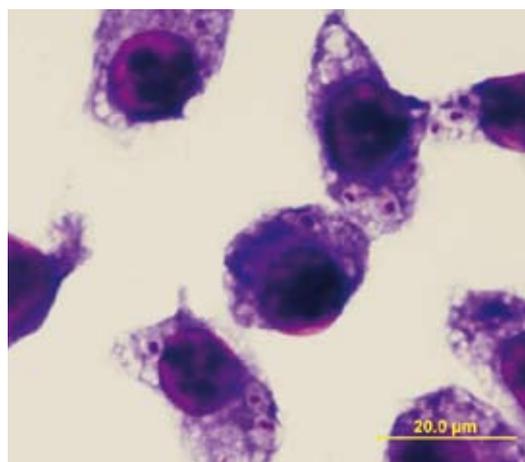
- **Nano drug delivery systems and design of stable nanobiodevices**
Nano drug delivery systems are promising tools to specifically deliver drug molecules to the inflammatory site.
- **Selectively targeting activated macrophages in inflammatory diseases through Folate Receptors**
Recent studies have shown that **the β isoform of the Folate Receptor** is highly expressed by activated macrophages and thus has become an interesting marker for inflammation diagnosis and therapy.
- **Antibody based approaches to ensure high specificity**
With the aim of increasing therapeutic success without side effects, selective activated macrophage recognizing antibodies will be designed and used.
- **Therapeutic agent for high treatment efficacy**
The ultimate goal of this project is to deliver specifically drugs (pharmacological compounds) or **siRNA** (small interfering RNA) to activated macrophages, inhibiting signalling pathways that are elicited in the continuous inflammatory process.

Objectives of the project

NANOFOL has adopted a specific **risk amelioration strategy** to attain objectives in a **step-by-step approach** in order to gradually improve the concept (specificity, stability, side effects and efficacy) from lower to higher risk solutions ensuring **reduced animal testing** and **high human safety**.

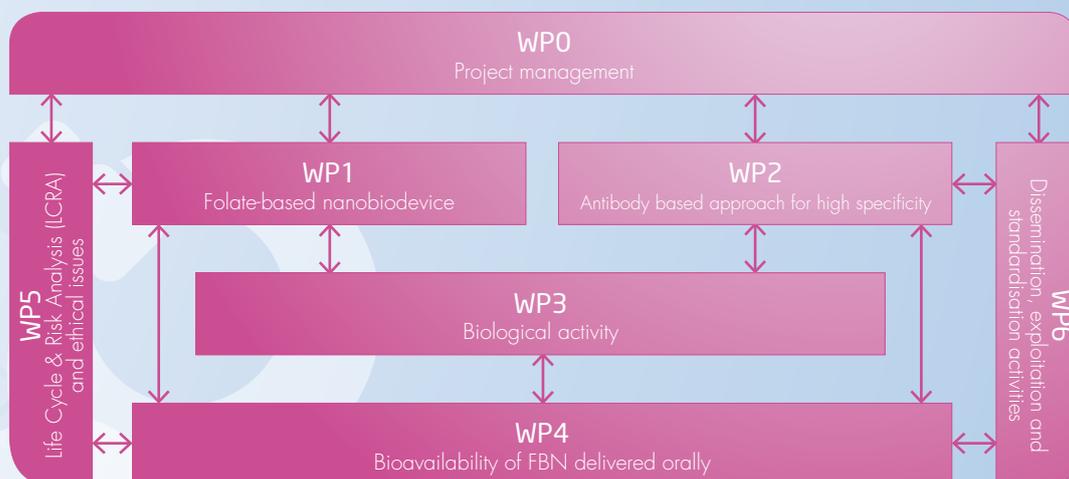
NANOFOL will improve treatment of chronic inflammatory diseases by fulfilling the following objectives:

- Design, development and production of **nanobiodevices** directly targeting effector cells.
- Experimental design that will enable **minimal animal experimentation**.
- Development of a **strategy to assess potential life cycle risks** ensuring safe nanobiodevice-mediated delivery.
- Setting-up **better citizen awareness** on nanomedicine-based therapies and training activities.

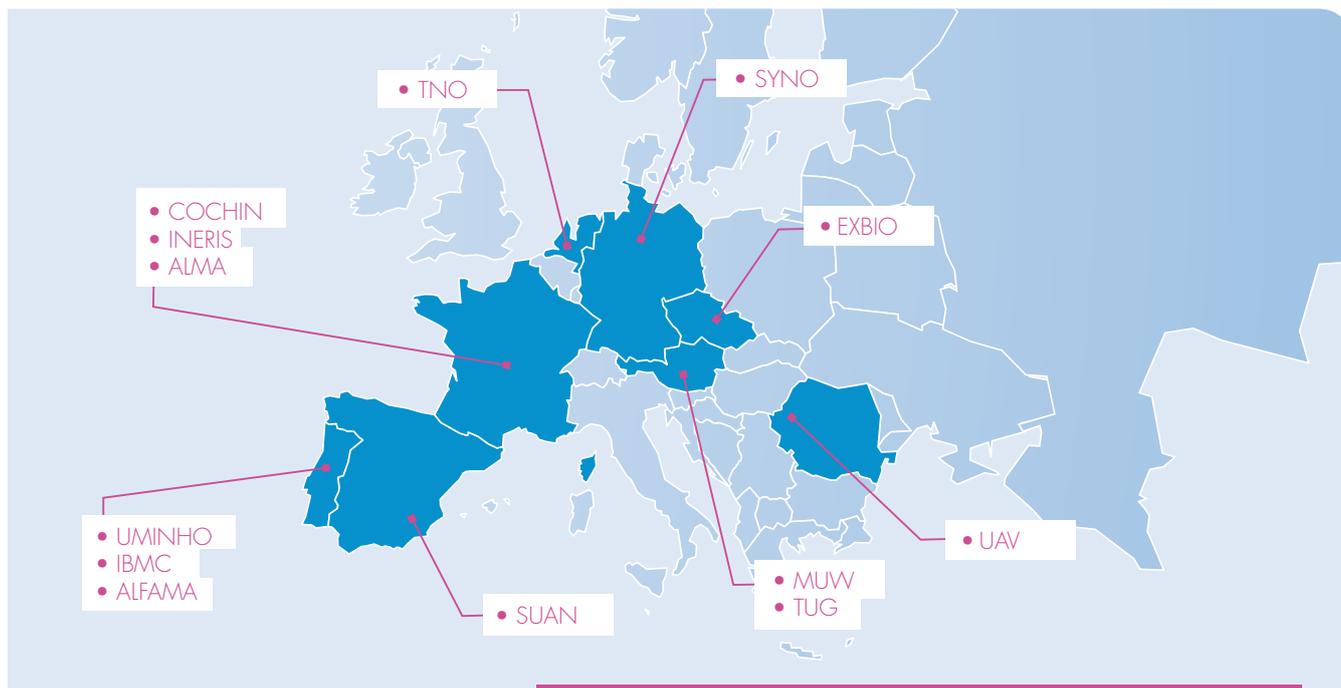


In vitro cultured macrophages during phagocytosis

Work Flow



Description and complementarities of the consortium



The consortium formed to fulfil NANOFOL's objectives is composed of 13 partners from 8 European countries.

Small and Medium size Enterprises: Suarfarma SA (ES), Synovo GmbH (DE), Exbio Praha AS (CZ), ALFAMA - Investigação e Desenvolvimento de Produtos Farmacêuticos, Lda (PT).

Research centers or universities: Universidade do Minho (PT), Technische Universitaet Graz (AT), Netherlands Organisation for Applied Scientific Research - TNO (NL), Instituto de Biologia Molecular e Celular - IBMC (PT), Institut National de la Santé et de la Recherche Médicale - INSERM (FR) / Institut Cochin – COCH (FR), Medizinische Universitaet Wien (AT), "Aurel Vlaicu" University of Arad (RO), Institut National de l'Environnement et des RISques - INERIS (FR).

Consulting Company: ALMA Consulting Group SAS (FR).

Acknowledgement

The NANOFOL Project addresses the area "Development of nanotechnology-based systems for diagnosis and/or therapy for diabetes, musculo-skeletal or inflammatory diseases", started on the 1st of December 2009 and will have a total duration of 48 months.

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