

Game-Changing Research Project “SINPAIN” Starts: Developing a Next-Generation Advanced Therapy for Knee Osteoarthritis

Tackling the pressing need for effective and economical osteoarthritis treatments

Donostia-San Sebastián, Spain, 17 May 2022 – Osteoarthritis is the most common chronic joint disorder worldwide, but there is no efficient treatment so far. Therefore, new medications are needed to improve the quality of life for those affected and reduce the high costs associated with this disease. Taking advantage of the explosion of RNA technologies in the last years, the SINPAIN project sets out to fill this gap by developing a safe, efficient and cost-effective small interfering RNA (siRNA)-based therapy combining RNA technology with improved intraarticular hyaluronic acid-based knee viscosupplement (IA-HA) containing tissue engineering tools, such as nanocarriers. Ultimately, the team aims to develop more personalised diagnostic and treatment options for different stages of osteoarthritis. Bringing together specialists from twelve partner institutions based in Europe and the US, SINPAIN receives a total funding of EUR 5,3 million from the Horizon Europe programme over the next four and half years.

Osteoarthritis is among the leading causes of physical disability with numbers rising. Currently, seven percent of the global population is affected. Patients mostly suffer from chronic pain, stiffness, tenderness and limited flexibility. From the current studies available, no specific cure for osteoarthritis exists and its severity varies from patient to patient. Besides the social burden and suffering associated with osteoarthritis, it also constitutes an economic strain for society. Medical costs can aggregate to over 10.000€ per patient annually. Osteoarthritis is a multifunctional disease, to which risk factors such as age, sex, obesity and genes contribute significantly. Older adults, and especially women, are disproportionately more often affected.

500 million patients worldwide are in need of novel therapy approaches

“Osteoarthritis patients depend on new treatments to alleviate chronic pain and slow disease progression. This degenerative disease is affecting an increasing number of people, who often endure a considerably reduced quality of life,” says project coordinator Dr Damien Dupin from the Spanish research organisation CIDETEC Nanomedicine. “There is a pressing and unmet global need, not only for effective therapeutic treatments, but also for understanding the causes and mechanisms of this disease – and that’s where SINPAIN comes in.”

Various recommendations for the management of osteoarthritis, such as exercise and weight loss exist, but show only limited effects due to the lack of patient adherence. Oral anti-inflammatory drugs are also frequently prescribed, but have shown limited success and increased use can lead to gastric complications or other side effects. Moreover, local surgery is



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required in some cases and may create relief, but does not stop the progression of osteoarthritis.

The creation of a pioneering combined siRNA advanced therapy

In the past, cartilage loss was viewed as the driving problem of osteoarthritis, but this paradigm is evolving. Once considered a purely mechanical disease, caused by cartilage wear, without considering the complex structure, pathology, and interactions of this disease, it is now seen as a complex biological response, connecting biomechanics, inflammation, and the immune system. SINPAIN is based on the understanding that there is an interplaying mechanism of symptoms.

Aiming to develop novel siRNA advanced therapy, the project will create models from biopsies of patients that allow a deep insight into knee osteoarthritis and will generate advanced siRNA-based products that help alleviate pain and slow down disease progression. The efficacy and safety of these nanotherapeutics will be validated in ex vivo and in vivo models that will be employed to elucidate biological mechanisms of the condition's progression. Profiles of the patients will then allow machine-learning tools to deliver personalised therapies according to the individual disease stage.

“The social benefit that regenerative and personalised treatments could bring to osteoarthritis patients has been widely discussed in the past. SINPAIN's approach has game-changing potential. Starting from a first-generation product, SINPAIN will increase complexity step by step and create a pipeline of four products for the four different stages of knee osteoarthritis. Available combined advanced treatments will be beneficial for osteoarthritis patients worldwide,” adds Dr Dupin.

The SINPAIN consortium is multidisciplinary and international: twelve partners from nine countries will bring their expertise in key areas, such as advanced therapies, vectors, biomaterials, immunology, biologic safety, musculoskeletal research or regenerative medicine to the project. SINPAIN represents five EU member states, but also includes organisations from Iceland, the UK, the USA and Switzerland to tackle this global issue.

Key Facts

Full Name: SINPAIN - A game changer for the treatment of osteoarthritis: a cost effective combined advanced therapy to treat knee osteoarthritis

Start Date: 1 May 2022

Duration: 54 months

Budget: 5,3 Mio €

Coordinator: CIDETEC

Website: www.osteoarthritis-sinpain.eu



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Project Partners

France

Inserm - National Institute of Health and Medical Research (Institut national de la santé et de la recherche médicale)
OZ Biosciences (OZB)

Germany

Saarland University
EURICE - European Research and Project Office GmbH

Iceland

Reykjavik University

Italy

UPO - Università del Piemonte Orientale

Portugal

i3S - Institute for Research and Innovation in Health (Instituto de Investigação e Inovação em Saúde da Universidade do Porto)

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