Acronym
SINPAIN

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

Programme
HORIZON-HLTH-2021-TOOL-06-02

Contract Number
101057778

Abstract
According to the WHO, osteoarthritis (OA) is one major cause of years lived with disability in the elderly and considered a high burden disease, which makes it a research priority in Europe. There is no cure for OA and SoA treatments need to be reconsidered. Current pharmacological interventions consist of analgesic, anti-inflammatory drugs as well as intraarticular steroids and hyaluronic acid (IA-HA) with moderate efficacy and associated long-term side effects. New medications are thus needed both to alleviate pain and slow down disease progression. Taking advantage of the explosion of RNA technologies in the last years, SINPAIN aims to develop a pipeline of siRNA-based therapy built on the combination of current technologies (dynamic IA-HA and nanocarriers) that will be designed step-by-step in order to reach a successful management of inflammation and innervation therapy for the treatment of early (grade 0-1) and later stages (grade 3-4) of knee osteoarthritis (OA). To do so, a nanoformulation composed of functional IA-HA that can be loaded with vectors for the delivery of siRNA targeting IL1? and NGF and nanocarriers will be developed. In parallel, large effort will focus on understanding the pathological mechanisms of OA. To validate efficacy in relevant potency assays, 3D coculture models will be developed with human cells and tested in unique bioreactors mimicking joint environment and biomechanics. With the identified cell targets, IA-HA will be modified with immunomodulator peptide which will activate the adaptive immune response, responsible for OA regeneration. The 4 pipeline products of SINPAIN will be validated in vivo in a relevant OA model with SoA techniques that will demonstrate the reduced inflammation and pain, as well as the cartilage regeneration for the last product. Taking advantage of all the data obtained during the project, a decision-making tool based on machine learning will be validated to offer patients a personalised therapy.

Duration
54 months (01/05/2022 – 31/10/2026)

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Coordinator

Damien Dupin
Fundación Cidetec
Phone: +34 943 30 90 22
Mail: ddupin@cidetec.es

Partners

- Fundación Cidetec
- OZ Biosciences SAS
- Saarland University
- Asphalion SL
- i3S – Instituto de Investigação e Inovação em Saúde da Universidade do Porto
- Università degli Studi del Piemonte Orientale Amedeo Avogadro
- EURICE – European Research and Project Office GmbH
- Reykjavik University
- The Regents of the University of California
- Institut National de la Santé et de la Recherche Médicale
- University of Liverpool
- AO Research Institute Davos

Project Website

www.osteoarthritis-sinpain.eu