



3.6.1 Bone Pathophysiology and Biomaterials Group

Publications: **3**

Q1: **2**

COMPOSITION

Nuria Elda Vilaboa Díaz. Investigadora Senior (Miguel Servet contract - I2). Jefe de Laboratorio. FIBHULP

Clara Escudero Duch. Investigadora Postdoctoral. CIBER-BBN

Marcos de Mesa Cáceres. Técnico de Laboratorio. FIBHULP

Mabel Falguera Uceda. Investigadora Predoctoral. Hospital Universitario La Paz

Eduardo García Cimbrello. Médico Emérito de la Comunidad de Madrid. Hospital Universitario La Paz. Profesor Asociado. Departamento de Cirugía. Facultad de Medicina. Universidad Autónoma de Madrid

Miguel Ángel Lerma Juárez. Investigador Predoctoral. FIBHULP

Leila Maestro Paramio. Investigadora Predoctoral. FIBHULP

Carmen Martín Hervás. Facultativo Especialista de Área en Radiodiagnóstico. Hospital Universitario La Paz. Profesora Asociada. Facultad de Medicina. Universidad Autónoma de Madrid

Alonso Carlos Moreno García. Facultativo Especialista de Área en Cirugía Otorrinolaringológica y Traumatología. Hospital Universitario La Paz

Laura Saldaña Quero. Investigadora Senior (Contrato Miguel Servet-Tipo II). Jefe de Laboratorio. FIBHULP

Gema Vallés Pérez. Investigadora Senior. Responsables de Cultivos Celulares y de los Laboratorios Comunes de IdiPAZ. FIBHULP



STRATEGIC OBJECTIVE

The Bone Pathophysiology and Biomaterials group includes basic and clinical researchers from IdiPAZ. The group has broad experience in clinical and basic research on biomaterials for orthopaedic implants and bone tissue engineering. The principal goal of the group is to improve the clinical outcome of orthopaedic surgery through research on implants and biomaterials used for manufacturing prosthetic devices.

The group is also interested in the study of mechanisms underlying joint diseases and in bone tissue engineering applications, in evaluating scaffolds manufactured by collaborative partners, in developing novel gene therapy strategies aimed to heal bone defects and in the study of the interactions of the immune and skeletal systems. Specific areas of clinical research on implants include follow-up studies on various devices in use for orthopaedic surgery.

The main areas of interest in basic research on the biocompatibility of materials include:

- understanding the influence of the surface biomaterial properties on the behaviour of bone-related cells.
- the study of cell reactions occurring in the vicinity of implanted materials caused by wear particles.
- the deliberate manipulation of cell responses after exposure to nanoparticles designed for gene delivery and optical hyperthermia applications.

The team is also interested in the development of transcriptional targeting strategies to ensure tight control of the expression of therapeutic proteins and their potential application in inducing an orchestrated expression of growth factors involved in bone healing.



RESEARCH LINES

- Clinical research in implants for bone repair.
- Biocompatibility studies of new materials for potential use in implants for bone repair: cell and surface interactions, cell and particle interactions.
- Study of the interactions between the immune and skeletal systems.

- Control of the expression of therapeutic transgenes and development of strategies to enhance bone regeneration.
- Study of the pathophysiology of joint diseases.

RESEARCH ACTIVITY

● Publications

- García-Rey E, Cruz-Pardos A, Saldaña L. New polyethylenes in total hip arthroplasty a 20-to 22-year follow-up study. *Bone Joint J.* 2022; 104B(9): 1032-8. Article. IF: 4.6; D1
- Moreno-García, A; Rodríguez-Merchán, EC. Orthobiologics: current role in orthopedic surgery and traumatology. *Arch Bone Jt Surg.* 2022; 10(7): 536-42. Review. IF: 1.3; Q4
- Uceda, MFI; Sánchez-Casanova, S; Escudero-Duch, C; Vilaboa, N. A Narrative review of cell-based approaches for cranial bone regeneration. *Pharmaceutics.* 2022; 14(1): 132. Review. IF: 5.4; Q1

● Research projects

Lerma Juarez MA. Contrato predoctoral (PRE2019-090430). MICIU. 2020-2024.

Management centre: FIBHULP

Saldaña Quero L. Identificación de factores moleculares implicados en la osteonecrosis idiopática: análisis del transcriptoma del tejido óseo (PI18/00643). ISCIII. 2019-2023.

Management centre: FIBHULP

Vilaboa Díaz NE, Saldaña Quero L. Desarrollo de fluidos que potencien o favorezcan la osteointegración de los implantes ante distintas situaciones. Mozo-Grau S. A. 2017-Ongoing.

Management centre: FIBHULP

Vilaboa Díaz NE. Contrato Miguel Servet Categoría A (CES07/031). CM. 2007-2025.

Management centre: FIBHULP

Vilaboa Díaz NE. Detección de activación de HSF partes XV y XVI. HSF Farmaceutica. 2004-Ongoing.

Management centre: FIBHULP

Vilaboa Díaz NE. Hidrogeles que responden a energía infrarroja y contienen adenovirus de alta capacidad. Aplicación en regeneración ósea (RTI2018-095159-B-I00). MICIU. 2019-2022.

Management centre: FIBHULP

Vilaboa Díaz NE. Potencial traslacional de inhibidores del factor de transcripción HSF1 como dro-

gas anticancerígenas (PID2021-126325OB-I00). Ministerio de Ciencia e Innovación. 2022-2024.

Management centre: FIBHULP

● Cibers and Retics

Vilaboa Díaz NE. Networked Biomedical Research Center for Bio-engineering, Biomaterials and Nanomedicine. (CIBER-bbn). Instituto de Salud Carlos III. (31/12/2024). FIBHULP

● Patents and trademarks

González Carrasco JL, Benavente Castro R, Cifuentes Cuellar SC, Lieblich Rodríguez M, Olalde Graells B, Atorrasagasti Goyalde G, Argarate Madariaga N, Pacha Olivenza MA, Fernández Calderón MC, Saldaña Quero L, González Martín ML, Pérez Giraldo C, Gallardo Moreno AM, inventors; CSIC, Fundación Tecnalia Research & Innovation, FIBHULP, Universidad de Extremadura, Centro de Investigación Biomédica en Red (CIBER). Moldable, biodegradable, biocompatible and bioresorbable implant material, method for its preparation and uses thereof. P201530683; 2015 May 18.

Martín Saavedra FM, Vilaboa Díaz NE, Ce-

brían Hernando V, Arruebo Gordo M, Santamaría Ramiro J, Gómez Navascués L, inventors; FIBHULP, CIBER-BBN, Universidad de Zaragoza, assignees. Fibrin hydrogel with plasmonic nanoparticles; P201330894, PCT/ES2014/070484; 2013 June 14.

Vilaboa Díaz NE, Calzado Martín A, Crespo García L, Saldaña Quero L, Moreo Calvo P, Alastrué Vera V, inventors; FIBHULP, CIBER-BBN, assignees. Chamber device for dynamic cell culture on biomaterials; P201330040, PCT/ES2013/070819; 2013 January 16.

Vilaboa Díaz NE, González Carrasco JL, Multigner Domínguez M, Lieblich Rodríguez M, Muñoz Hernández M, Frutos Torres E, Saldaña Quero L, inventors; FIBHULP, CSIC, CIBER-BBN, Universidad Alfonso X El Sabio, assignees. Magnesium/polymer composite biomaterial for biomedical applications; P201030950, PCT/ES2011/070440; 2010 June 21.

Vilaboa Díaz NE, González Carrasco JL, Saldaña Quero L, Frutos Torres E, inventors; FIBHULP, CSIC, CIBER-BBN, assignees. Method to obtain a metallic-coated biomaterial; P201030949, PCT/ES2011/070400; 2010 June 21.

