

**Parte A. DATOS PERSONALES**

|                   |                   |                 |      |
|-------------------|-------------------|-----------------|------|
|                   |                   | <b>FECHA CV</b> | 2024 |
| Nombre            | Mercedes          |                 |      |
| Apellidos         | Fernández Arévalo |                 |      |
| Sexo              | Mujer             |                 |      |
| DNI/NIE/Pasaporte |                   |                 |      |
| e-mail            |                   |                 |      |
|                   |                   |                 |      |

**A.1. SITUACION PROFESIONAL ACTUAL**

|                       |                                                                                             |        |  |       |  |
|-----------------------|---------------------------------------------------------------------------------------------|--------|--|-------|--|
| Organismo/Institución | Universidad de Sevilla                                                                      |        |  |       |  |
| Departamento          | Farmacia y Tecnología Farmacéutica                                                          |        |  |       |  |
| Dirección y país      |                                                                                             |        |  |       |  |
| Teléfono              |                                                                                             | E-mail |  |       |  |
| Categoría profesional | Catedrático de Universidad                                                                  |        |  | Desde |  |
| Palabras clave        | Nanomedicine. Controlled release. Targeting. Drugs. Peptides. Biomolecules. Microparticles. |        |  |       |  |
|                       |                                                                                             |        |  |       |  |

**A.3. Formación**

|                          |                        |            |
|--------------------------|------------------------|------------|
|                          | <b>Universidad</b>     | <b>Año</b> |
| Licenciatura en Farmacia | Universidad de Sevilla |            |
| Doctorado                | Universidad de Sevilla |            |

**Parte B. Resumen CV** (*max. 5000 characters, including spaces*)

Mercedes Fernández-Arévalo, is currently (since February 2021) the Director of the International Schools of Postgraduate and Doctorate at the University of Sevilla.

She is the founding researcher for the research group I+DNanomed, which currently develops, as main lines of research, nanotechnology applied to the development of new APIs and biomolecules administration systems, drug targeting, programmed release, mainly through experimental designs for pharmaceutical optimization. Her research group presents, as main interests and scientific objectives in the medium/long term: (i) nanosystems of oral administration of drugs with emphasis on the improvement of their bioavailability; (ii) functionalized nanoparticles for the treatment of selective breast cancer; and (iii) development of new nanoteragnostic agents that simultaneously allow treatment and diagnosis by imaging techniques.

She has 4 research sections (six-years), 1 transfer sections (six-years).

She is the principal researcher of 12 R&D&I projects of competitive public calls, having participated in a total of 17. She has experience in the transfer of research results, being responsible for 8 R&D contracts of special relevance with Companies. She has published more than 90 papers in international peer reviewed (ISI) journals, some of them in top journals (Q1 in Pharmaceutical Sciences; Q1 in Nanoscience and Nanotechnology), more than 150 papers presented at international congresses, as well as 7 book chapters. Total citations in Scopus 1495. h-index 24. 5 highly impact publications derived from this research: doi 10.1016/S0378-5173(02)00028-5 (104 cites); doi 10.1016/0378-5173(93)90225-5 (107 cites); doi 10.1016/j.ijpharm.2008.02.012 (100 cites); doi 10.1016/S0378-5173(01)00962-0 (101 cites); doi 10.2147/IJN.S34633 (84 cites).

She is co-inventor of 5 patents, last one (WO2016/128591A1) recently licensed to GBLX (USA), company with which I have signed a consulting services contract. She is responsible of several NDA agreements with national and international companies.

She attracted direct competitive funding worth more than 2,5 M, at regional, national and international levels. She is currently referee of 21 top-ranked international journals in her area of expertise. She has received several awards (2011 Correo Farmacéutico de Las mejores iniciativas de la Farmacia en 2011, 2017 Publicación Científica del Mes (Facultad Farmacia,

US) (June 2017). She has experience as Project evaluator (Banco de Evaluadores Iberoamericano (BIE)-COLCIENCIA - ANEP -CONACyT). Her achievements in terms of scientific production can be consulted with the following identifiers: K-1692-2014 (WoS Researcher ID), 7003615287 (SCOPUS Author ID) and 0000-0002-4283-3356 (Open Researcher and Contributor ID-ORCID).

She has been responsible of the national and international training programs of the pre- and posdoc members of the members of her research group (national univ. of Vitoria, Santiago de Compostela, Valencia, Cádiz, Granada) (univ of Italy, Portugal, Germany, England, Swiss, USA (Texas (Austin), MIT (Koch Inst. for Integrative Cancer Inv., Cambridge)).

#### SCIENTIFIC ACTIVITY MANAGEMENT:

-Director of the Research Secretariat of the University of Seville (2012-2020) (<http://www.us.es/acerca/organizacion/equipo/viceinvest#dsi>).

-Director of the International School of Postgraduate and Doctorate (2021-)

-Responsible for the research group CTS480 of PAIDI since 2001 ([url: grupos.us.es/idnanomed/](http://grupos.us.es/idnanomed/)).

#### DIRECTION OF PERSONAL TRAINING:

Responsible of 4 researcher grants, 12 PhD students with highest qualification (5 of them of European Doctorate or of International Mention with important prizes), 6 Post-Docs, and 24 positions under the Youth Employment Plan (Univ. Sevilla, 2017, 2020).

She participates in different events and social media for spreading science to the society, and also in several Knowledge Transfer Forums. She is responsible of several NDA agreements with national and international companies.

## Parte C. APORTACIONES MÁS RELEVANTES (de los últimos 10+3 años)

### C.1. Publicaciones (incluidos libros)

#### Capítulos de libro:

M. Durán-Lobato, M.A. Holgado, J. Álvarez-Fuentes, J.L. Arias, M. Fernández-Arévalo, L. Martín-Banderas. Peroral Polyester Drug Delivery Systems. "Handbook of Polyester Drug Delivery Systems". Editorial Pan Stanford Publishing Company. Editor Ravi Kumar (2015).

M.A. Holgado, J.L. Venero, J. Álvarez-Fuentes, M. Fernández-Arévalo, L. Martín-Banderas. Potential nanocarriers for brain delivery en "Nanoengineering Strategies and Nanomedicines against severe diseases". Vol. 2. Edited by Prof. Arias Mediano. Editorial Science Publishers (an imprint of CRC Press, Boca Raton, FL), Enfield, New Hampshire 03478 USA (2014) ISBN 9781482262711.

#### Aportaciones a congresos:

M. Fernández Arévalo. Drug delivery technology: new analgesic formulations in development. April 14-24, **2021**. Online Conference. I Congreso SEMDOR. Guest speaker.

M. Fernández Arévalo. Importance of patents in the pharmaceutical sector. An example of the patent route of the Faculty of Pharmacy of the University of Seville. Mach **2021**. SEFIG- La importancia de las patentes en el mundo académico y empresarial. Online Conference. Guest speaker.

M. Fernández Arévalo. Novel delivery mechanisms: nanotechnology research. November 6-10, **2018**. 4th Annual life sciences strategy meeting and innovation in medical cannabis therapies symposium. Las Vegas, Nevada, United States of America. Guest speaker.

#### Artículos:

M. El-Hammadi; A. Small-Howard; C. Jansen, M. Fernández-Arévalo; H. Turner, L. Martín-Banderas. Poly(Ethylene Glycol)-Poly(Lactic-Co-Glycolic Acid) Nanoparticles Enhance the Effects of Cannabis-Based Terpenes on Calcium Influx in TRPV1-Expressing Cells. Potential Use for Chronic Pain. *Int. J. Pharm.* **Aceptado 25 Enero 2022 [IF 5.875, Q1] Autor 4/6**.

M. El-Hammadi; A. Small-Howard; M. Fernández-Arévalo; L. Martín-Banderas. Development of enhanced drug delivery vehicles for three cannabis-based terpenes using poly(lactic-co-

- glycolic acid) based nanoparticles. *Industrial Crops & Products*, 164, 113345, 2021 [IF 5.645, D1 (5/91)] <https://doi.org/10.1016/j.indcrop.2021.113345>. Autor 3/4.
- M.D. Cayero-Otero, MJ Gomes, C Martins, J. Álvarez-Fuentes, M. Fernández-Arévalo, B. Sarmiento, L. Martín-Banderas. In vivo Biodistribution of venlafaxine-PLGA nanoparticles for brain delivery: plain vs functionalized nanoparticles. *Expert Opinion on Drug Delivery* 2019;16(12):1413-1427. [IF: 5.40, D1 (20/267)]. Autor 5/7.
- M.D. Cayero-Otero, A.M. Espinosa-Oliva, A.J. Herrera, I. García-Domínguez, M. Fernández-Arévalo, Lucía Martín-Banderas, R.M. de Pablos. Potential Use of Nanomedicine for the Anti-inflammatory Treatment of Neurodegenerative Diseases. *Current Pharmaceutical Design*, 2018, 24(14), 1589-1616 [IF:2.757; Q2 (114/261)]. Autor 5/7.
- Berrocó Domínguez, E.M. Rey Brea, R., Fernández-Arévalo, M., Micó Segura, JA, Martín-Banderas, L. Single oral dose of cannabinoid derivate loaded PLGA nanocarriers relieves neuropathic pain for eleven days. *Nanomedicine: Nanotechnology, Biology and Medicine*. 2017, 13(8), 2623-2632. [IF: 4.727, Cites: 12, Q1 (21/160)]. Autor 4/5.
- Martín-Banderas, L., Holgado, M.Á., Durán Lobato, M.M., Álvarez-Fuentes, J., Fernández-Arévalo, M. Role of nanotechnology for enzyme replacement therapy in lysosomal diseases. *Curr. Med. Chem.* 2016. 23(9), 929-952 [IF:3.249, Cites: 3; D1 (5/59)]. Autor 5/5.
- M. Durán-Lobato, L. Martín-Banderas, R. Lopes, L. M. D. Gonçalves, M. Fernández-Arévalo, A. J. Almeida. Lipid Nanoparticles as an Emerging Platform for Cannabinoid Delivery: Physicochemical Optimization and Biocompatibility. *Drug Development Ind. Pharm.* 2016; 42(2):190-198. [IF: 2.135; Q2 (121/255)]. Autor 5/6.
- L. Martín-Banderas, I. Muñoz-Rubio, J. Prados, J. Álvarez-Fuentes, J.M. Calderón-Montaña, M. López-Lázaro, J.L. Arias, M.C. Leiva, M.A. Holgado, M. Fernández-Arévalo. In vitro and in vivo evaluation of  $\Delta^9$ -tetrahydrocannabinol/PLGA nanoparticles for cancer chemotherapy. *Int. J. Pharm.*, 2015, 487, 205-212. [IF: 3.994 ; Q1 (44/255)]. Autor: 10/10.
- Durán-Lobato M, Martín-Banderas L, Gonçalves LMD, Fernández-Arévalo M, Almeida A. Comparative study of chitosan- and PEG- coated lipid and polymeric nanoparticles as oral delivery systems for cannabinoids. *J. Nanopart. Res.* 2015, 17:61 [IF: 2.278; T1]. Autor: 4/5.
- Durán-Lobato; I. Muñoz-Rubio; M.A. Holgado; J. Álvarez-Fuentes; M. Fernández-Arévalo; L. Martín-Banderas. Enhanced Cellular Uptake and Biodistribution of a Synthetic Cannabinoid Loaded in Surface-Modified Poly(lactic-co-glycolic acid) Nanoparticles. *J. Biomed. Nanotech.*, 2014, 10(1-2), 1068-1079 [IF: 5.25; T1]. Autor 4/6.
- Martín-Banderas, I. Muñoz-Rubio, J. Álvarez-Fuentes, M. Durán-Lobato, J.L. Arias, M.A. Holgado, M. Fernández-Arévalo. Engineering of  $\Delta^9$ -tetrahydrocannabinol delivery systems based on surface modified-PLGA nanoplateforms. *Colloids Surf. B*, 2014 123, 114–122 [IF: 4.287; T1]. Autor 7/7.
- M. Durán-Lobato, A. Enguix-González, M. Fernández-Arévalo, L. Martín-Banderas. Statistical analysis of solid lipid nanoparticles produced by high-pressure homogenization: a practical prediction approach. *J. of Nanoparticle Research*, 2013, 15(3), 1443-1457 [IF: 2.271; Q1 (59/251)]. Autor 3/4.

## C.2. Proyectos de investigación

**Estrategia nanoteragnóstica para aterosclerosis basada en un terpeno natural activador del sistema cannabinoide** - PID2021-122714OB-I00

**Nanotransportadores activos de cannabinoides para el tratamiento de la aterosclerosis.**

Convocatoria Proyectos de I+D+i en el marco del Programa Operativo FEDER Andalucía 2014-2020. IP-1: Lucía Martín Banderas (Univ. Sevilla). Duration: 27 month (01.02.2020-30.04.2022). Funding received: 90.000 €. Ref. US-1263053

**Medicamentos Innovadores basados en Nanomedicina.** Ayudas a actividades de transferencia de conocimiento entre los Agentes del Sistema Andaluz del Conocimiento y el tejido productivo. PAIDI 2020. Entities: Consejería: Economía, Conocimiento, Empresas y Universidad. IP-2: M. Fernández Arévalo (Univ. Sevilla). Duration: 22 months (01.02.20-30.11.21). Funding received: 154.600,0 €. Ref.AT17\_5548\_USE.

**Nanopartículas Biocompatibles de Paclitaxel radiomarcadas para teragnosis de metástasis del cáncer de mama (PI-0038/2014).** Financing entity: Fundación Andaluza Progreso y Salud. Consejería de Igualdad, Salud y Políticas sociales. Junta de Andalucía. Participating entities: Dpto Farmacia y Tecnología Farmacéutica (Univ. Sevilla). Serv.

Radiofarmacia, Serv. Medicina Nuclear y Serv. Oncología Molecular del HU Virgen del Rocío (Sevilla). IP: Lucía Martín Banderas (Univ. Sevilla). Date: 01.08.2015 - 31.07.2017. Funding received: 33.984,14 €.

**Nanosistemas como Transportadores de Cannabinoides para el Tratamiento del Dolor Neuropático (P09-CTS-5029).** Financing entity: Junta de Andalucía (Consejería de Innovación, Ciencia y Empresas). Participating entities: Universidad de Sevilla. Universidad de Cádiz. H.U. Puerta del Mar de Cádiz. IP: Mercedes Fernández Arévalo. Date: 03-02-2010/03-02-2014. Funding received: 279.024,00 €. Participation: Investigator.

**Mechanisms of Generation of Micron-Sized Drops and Bubbles With Applications to Industrial Processes, Pharmacology and Medicine- I (DPI2011-28356-C03-01).** Financing entity: Plan Nacional 2011. Entities: Ministerio Economía y Competitividad. Secretaria de Estado de Investigación, Desarrollo e Innovación. IP: JM Gordillo Arias de Saavedra. Date: 01-01-2012/31-12-2014. Funding: 214.170€. Participation: Investigator.

### **C.3. Contratos I+D entre Universidad y Empresa (68/83 LOU)**

**Development of polymeric nanoparticles of CBGA for oral administration in combination with terpenes-loaded PLGA nanopart** (Ref. 4290). Financing entity: GBS Global Biopharma, Inc. IPs: L. Martín-Banderas / M. Fernández-Arévalo. (13/10/2021 – 12/04/2023). Budget: 60.400 €.

**Production, Characterization and Stability Study of polymeric nanoparticles for CB13 and cannabis terpenes for pain treatment** (Ref. 4116/0883). Financing entity: GBS Global Biopharma, Inc. IPs: L. Martín-Banderas / M. Fernández-Arévalo. (01/07/2020 – 31/12/2022). Budget: 93.000 €.

**Development of polymeric nanoparticles for cannabis terpenes oral administration in pain treatment** (Ref. 3154/0883). Financing entity: Growblox Life Sciences LLC. IPs: L. Martín-Banderas / M. Fernández-Arévalo. (07/2017–12/2019). Budget: 117.000 €.

**Production and Characterization of polymeric nanoparticles for CB13 and cannabis terpenes for pain treatment.** Financing entity: GBS Global BioPharma, Inc. Participating entities: USE, GBScience. IPs: L. Martín-Banderas / M. Fernández-Arévalo. (09/2019 – 05/2020). Budget: 39.212 €.

### **C.4. Patentes**

Small-Howard, A.; Martín Banderas L., El-Hammadi M., Fernández Arévalo, M. Title “Therapeutic nanoparticles encapsulating terpenoids and/or cannabinoids” Application nr.: 16/686069. Publication date: 05/21/**2020**. United States Patent and Trademark Office. Titular: Univ. Sevilla and Growblox Life Sciences, LLC (USA).

Martín-Banderas; Cayero Otero; Fernández Arévalo; Berrocoso Domínguez E.; Pérez Caballero L.; Micó Segura J.A. Application nr.: P201930218 Title: “Composición farmacéutica para su uso en el tratamiento de la depresión por vía intranasal” Priority country: España. Priority date: 27/03/**2019** Titular: Univ. Sevilla/Cibersam/Univ. Cádiz.

Martín Banderas, Lucía; Fernández Arévalo, Mercedes; Berrocoso Domínguez, Esther; Micó Segura, Juan Antonio. Title: “Method for Producing a Pharmaceutical Composition of Polymeric Nanoparticles for Treating Neuropathic Pain Caused by Peripheral Nerve Compression”. Application number: P2001500129. WO2006/128591 A1. Priority country: España. Priority date: 09/02/**2015**. Titular entity: Univ. Sevilla/CiberSam/Univ. Cádiz. Operator: Growblox Life Sciences, LLC (USA).