



Novel magnetic nanostructures for medical applications

Fact Sheet

Project Information

MAGNAMED

Grant agreement ID: 734801

[Project website](#)

DOI

[10.3030/734801](https://doi.org/10.3030/734801)

Project closed

EC signature date

7 December 2016

Start date

1 April 2017

End date

31 May 2023

Funded under

EXCELLENT SCIENCE - Marie Skłodowska-Curie Actions

Total cost

€ 846 000,00

EU contribution

€ 846 000,00

Coordinated by

UNIVERSIDAD DEL PAIS VASCO/
EUSKAL HERRIKO
UNIBERTSITATEA



Spain

Objective

MAGNAMED designs, fabricates, and assesses novel magnetic nanostructures (MNS) with unique spin configurations for innovative diagnostics and therapy techniques. An early stage detection and an effective treatment are keystones to reduce cancer mortality. Current clinical procedures fail to detect small concentration of tumoral biomarkers. Magnetic nanoparticles (MNP), like beads, have attracted much attention for their capability to improve cancer detection limits and treatment technologies. However, there are several limitations to the use of MNP. As an emerging alternative, MNS are being explored. Unlike MNP, MNS (e.g. nanodisks) present a planar shape with novel properties for diagnosis: high magnetic moment

and large size, which can significantly improve the sensor sensitivity, and for therapy: due to their planar shape, alternate magnetic fields provoke a magneto-mechanical action on the cell membrane that triggers cell death. The efficiency of MNS in these two medical applications has not been investigated yet for MNS at the nanometer scale. The challenge of this project is to produce MNS with nanometer dimensions suitable for medical applications. Several lithography techniques will be used to fabricate MNS in vortex and antiferromagnetic spin configurations covering a broad size range (40 to 4000 nm). After functionalization, MNS will be exploited in: (i) Diagnostics, using giant magnetoresistance (GMR) sensors for the detection of tumoral biomarkers (dermcidin and carcinoembryonic antigen), and (ii) Therapy, effectiveness of tumoral cell annihilation by the magneto-mechanical action of MNS will be evaluated in vitro assays of melanoma and colorectal cancer cells. MAGNAMED is a cross-sectoral and interdisciplinary project involving Physics, Chemistry and Medicine. Findings will have a medium-term impact on the European strategy for early stage detection of cancer and a long-term impact on the development of novel and groundbreaking therapeutics techniques.

Fields of science (EuroSciVoc)

[social sciences](#) > [sociology](#) > [demography](#) > **[mortality](#)**

[medical and health sciences](#) > [clinical medicine](#) > [oncology](#) > [skin cancer](#) > **[melanoma](#)**

[medical and health sciences](#) > [clinical medicine](#) > [oncology](#) > **[colorectal cancer](#)**

[engineering and technology](#) > [electrical engineering, electronic engineering, information engineering](#) > [electronic engineering](#) > **[sensors](#)**

[engineering and technology](#) > [nanotechnology](#) > **[nano-materials](#)**



Keywords

[nanomagnetism](#)

[magnetic nanostructures](#)

[biomedical application](#)

[nanotechnology](#)

[vortex state](#)

[cancer diagnostic](#)

Programme(s)

[H2020-EU.1.3. - EXCELLENT SCIENCE - Marie Skłodowska-Curie Actions](#)

MAIN PROGRAMME

[H2020-EU.1.3.3. - Stimulating innovation by means of cross-fertilisation of knowledge](#)

Topic(s)

[MSCA-RISE-2016 - Research and Innovation Staff Exchange](#)

Call for proposal

[H2020-MSCA-RISE-2016](#) 

[See other projects for this call](#)

Funding Scheme

[MSCA-RISE - Marie Skłodowska-Curie Research and Innovation Staff Exchange \(RISE\)](#)

Coordinator



UNIVERSIDAD DEL PAIS VASCO/ EUSKAL HERRIKO UNIBERTSITATEA

Net EU contribution

€ 328 500,00

Total cost

€ 328 500,00

Address

BARRIO SARRIENA S N

48940 Leioa

 **Spain** 

Region

Noreste > País Vasco > Bizkaia

Activity type

Higher or Secondary Education Establishments

Links

[Contact the organisation](#)  [Website](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Participants (8)



IMG PHARMA BIOTECH SOCIEDAD LIMITADA

Spain

Net EU contribution

€ 85 500,00

Address

**PARQUE TECNOLOGICO DE ZAMUDIO, ASTRONDO BIDEA, ED. BICBIZKAIA 612, MOD.5
48160 Derio**

SME

Yes

Region

Noreste > País Vasco > Bizkaia

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

[Contact the organisation](#)

[Participation in EU R&I programmes](#)

[HORIZON collaboration network](#)

Total cost

€ 85 500,00



NANOVEX BIOTECHNOLOGIES SL

Spain

Net EU contribution

€ 9 000,00

Address

**PARQUE TECNOLOGICO DE ASTURIAS
33428 Llanera**

SME

Yes

Region

Noroeste > Principado de Asturias > Asturias

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

[Contact the organisation](#)

[Participation in EU R&I programmes](#)

[HORIZON collaboration network](#)

Total cost

€ 9 000,00



UNIVERSIDAD COMPLUTENSE DE MADRID

Spain

Net EU contribution

€ 45 000,00

Address

AVENIDA DE SENECA 2

28040 Madrid

Region

Comunidad de Madrid > Comunidad de Madrid > Madrid

Activity type

Higher or Secondary Education Establishments

Links

[Contact the organisation](#)

[Website](#)

[Participation in EU R&I programmes](#)

[HORIZON collaboration network](#)

Total cost

€ 45 000,00



INESC MICROSISTEMAS E NANOTECNOLOGIAS - INSTITUTO DE ENGENHARIA DE SISTEMAS E COMPUTADORES PARA OS MICROSISTEMAS E AS NANOTECNOLOGIAS

Portugal

Net EU contribution

€ 99 000,00

Address

RUA ALVES REDOL 9

1000 029 Lisboa

Activity type

Research Organisations

Links

- [Contact the organisation](#)
- [Website](#)
- [Participation in EU R&I programmes](#)
- [HORIZON collaboration network](#)

Total cost

€ 99 000,00



UNIVERSIDADE DO PORTO

Portugal

Net EU contribution

€ 166 500,00

Address

PRACA GOMES TEIXEIRA
4099-002 Porto

Region

Continente > Norte > Área Metropolitana do Porto

Activity type

Higher or Secondary Education Establishments

Links

- [Contact the organisation](#)
- [Website](#)
- [Participation in EU R&I programmes](#)
- [HORIZON collaboration network](#)

Total cost

€ 166 500,00



VIENNA BIOCENTER CORE FACILITES GMBH

Austria

Net EU contribution

€ 27 000,00

Address

DR BOHR GASSE 3
1030 Wien

SME 
Yes

Region
Ostösterreich > Wien > Wien

Activity type
Other

Links
[Contact the organisation](#) 
[Participation in EU R&I programmes](#) 
[HORIZON collaboration network](#) 

Total cost
€ 27 000,00



**ICETA INSTITUTO DE CIENCIAS, TECNOLOGIAS E AGROAMBIENTE DA
UNIVERSIDADE DO PORTO**

 Portugal
Net EU contribution
€ 27 000,00

Address
**RUA D MANUEL II APARTADO 55142
4051 401 Porto** 
Region
Continente > Norte > Área Metropolitana do Porto

Activity type
Research Organisations

Links
[Contact the organisation](#) 
[Participation in EU R&I programmes](#) 
[HORIZON collaboration network](#) 

Total cost
€ 27 000,00



AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS
 Spain

Net EU contribution

€ 58 500,00

Address

CALLE SERRANO 117
28006 Madrid 

Region

Comunidad de Madrid > Comunidad de Madrid > Madrid

Activity type

Research Organisations

Links

[Contact the organisation](#)  [Website](#) 
[Participation in EU R&I programmes](#) 
[HORIZON collaboration network](#) 

Total cost

€ 58 500,00

Partners (9)



PARTNER 

UNIVERSIDAD DE SANTIAGO DE CHILE

 Chile

Net EU contribution

€ 0,00

Address

AVENIDA LIBERTADOR BERNARDO O'HIGGINS 3363
9170022 Santiago 

Activity type

Higher or Secondary Education Establishments

Links

[Contact the organisation](#)  [Website](#) 
[Participation in EU R&I programmes](#) 
[HORIZON collaboration network](#) 

Total cost

No data



PARTNER 

COMISION NACIONAL DE ENERGIA ATOMICA

 Argentina

Net EU contribution

€ 0,00

Address

**Avda. del Libertador 8250
1429 Buenos Aires** 

Activity type

Research Organisations

Links

[Contact the organisation](#)  [Website](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Total cost

No data



PARTNER 

COMISSAO NACIONAL DE ENERGIA NUCLEAR- CENTRO DE DESENVOLVIMENTO DA TECNOLOGIA NUCLEAR

 Brazil

Net EU contribution

€ 0,00

Address

**RUA GENERAL SEVERIANO 90
22290 901 Rio De Janeiro** 

Activity type

Research Organisations

Links

[Contact the organisation](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Total cost

No data



PARTNER 

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

 United States

Net EU contribution

€ 0,00

Address

FRANKLIN STREET 1111 12 FLOOR
94607 Berkeley 

Activity type

Higher or Secondary Education Establishments

Links

[Contact the organisation](#)  [Website](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Total cost

No data



PARTNER 

THE UNIVERSITY OF TEXAS SYSTEM

 United States

Net EU contribution

€ 0,00

Address

COLORADO STREET 601
78701 2982 Austin 

Activity type

Higher or Secondary Education Establishments

Links

[Contact the organisation](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Total cost

No data



PARTNER

UNIVERSIDAD TECNICA FEDERICO SANTA MARIA

Chile

Net EU contribution

€ 0,00

Address

AVENIDA ESPANA 1680

. VALPARAISO

Activity type

Higher or Secondary Education Establishments

Links

[Contact the organisation](#)

[Participation in EU R&I programmes](#)

[HORIZON collaboration network](#)

Total cost

No data



PARTNER

UNIVERSIDADE ESTADUAL DE CAMPINAS

Brazil

Net EU contribution

€ 0,00

Address

CIDADE UNIVERSITARIA ZEFERINO SN

13083 875 Campinas Sp

Activity type

Higher or Secondary Education Establishments

Links

[Contact the organisation](#)

[Participation in EU R&I programmes](#)

[HORIZON collaboration network](#)

Total cost

No data



PARTNER 

UNIVERSIDAD DE TALCA

 Chile

Net EU contribution

€ 0,00

Address

2 NORTE 685, CASILLA 721

3465548 Talca 

Activity type

Higher or Secondary Education Establishments

Links

[Contact the organisation](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Total cost

No data



PARTNER 

UNIVERSIDAD DE LOS ANDES FUNDACION

 Colombia

Net EU contribution

€ 0,00

Address

CARRERA 1 18A-10

Bogota Dc 

Activity type

Higher or Secondary Education Establishments

Links

[Contact the organisation](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Total cost

No data

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European Union, 2025

