

CICbiomaGUNE

MEMBER OF
BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

EXCELENCIA
MARIA
DE MAEZTU
07/2018 - 06/2022

Activity Report 2020





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Directors' Message

2020 has not been a regular year in any respect. The unexpected COVID-19 pandemic has altered our lives in many ways during 2020, and research is not an exception. During several periods of the year, we were instructed such unusual measures as complete lockdown, severe limitations in the occupancy of labs and offices, as well as strong restrictions against interpersonal relationships and in-person meetings. The Direction of CIC biomaGUNE often had to implement new regulations on a very short term and most likely not always in the most efficient manner, but always aiming to keep health and safety of our personnel above everything else. We are happy that none of us suffered any severe infection so far and we hope it will stay like this. We would especially like to thank those who volunteered to work during the worst, early period of the pandemic, to assist the local hospitals when there was insufficient supply from companies. We should also thank the whole CIC biomaGUNE community for strictly following the (changing) directions and constantly cooperating and adapting to new work conditions.

In spite of all restrictions, communication difficulties, lack of travel and even severe lockdown, we can be most proud about the overall performance of our researchers. We had excellent scientific results, with a large amount of high (some outstanding) quality publications and patents, unusually high success in EU funding, as well as a record number of contracts with companies, which was only possible thanks to the fabulous support by our administration, IT and maintenance teams, as well as a great team spirit leading to plenty of internal collaborations. Still, this report will clearly show that some of the activity was hindered by the pandemic. In particular, we could hardly host visiting students and researchers, our seminar program was completely stopped for months and then restarted in an online modality, outreach activities were also heavily affected by difficulties in bringing people together. We are hoping that coming years will bring back our normal way of doing things, even though we will probably see some changes related to the recent experience, such as increased ratio of remote work or reduced travel schedules, we'll see.

We are also proud to have approved in 2020 the 1st Equality Plan reinforcing our commitment toward equality.

We invite you to browse through this report to exciting publications that were possible thanks to the enthusiasm and excellent performance of staff at CIC biomaGUNE, as well as our collaborators, both locally and internationally.

Kind regards,

Luis M. Liz-Marzán, Scientific Director

José M. Mato, Director General



José M. Mato, Director General (left) and Luis M. Liz-Marzán, Scientific Director (right)

Presentation

The Center for Cooperative Research in Biomaterials **CIC biomaGUNE**, member of the Basque Research and Technology Alliance (**BRTA**), is a non-profit research organization created to promote scientific research and technological innovation at the highest levels in the Basque Country, following the BioBasque policy in order to create a new business sector based on biosciences.

Located in the Science and Technology Park of Gipuzkoa (Donostia-San Sebastián), the activity of CIC biomaGUNE is conducted by a team of 12 international and dynamic research groups, which develop high-level research at the interface between chemistry, physics and biology, with particular emphasis on the properties and applications of nanostructures at the biomolecular level. The final aim of CIC biomaGUNE's research is to contribute to understanding the way in which biological systems interact with nanometer-sized materials, at the molecular level.

The main research lines deal with the design, preparation and characterization of biofunctional nanostructures and their *in vitro* and *in vivo* biological evaluation, to be used in the study of biological processes and the development of biomedical tools such as theranostic, multitherapeutic or multimode imaging platforms.

To carry out this ambitious program of research, the Center counts with a unique research infrastructure, equipped with advanced nanoscience, biochemistry and molecular imaging facilities, including fully





equipped research laboratories, Technological Platforms and the Molecular Imaging Facility, one of the most complete preclinical imaging research infrastructures in Europe.

CIC biomaGUNE started its activity in December 2006. In the course of almost fourteen years, with an average critical mass of around 120 researchers, the Center has obtained national and international recognition as a scientific leader and knowledge builder in the field of biomaterials. Among other achievements,

our activity has resulted in the generation of knowledge (publications, patents, PhD theses), the internationalization of research through collaborations with international bodies and institutions, as well as opening our facilities to the scientific community and the industrial sector.

In 2018 CIC biomaGUNE earned the accreditation as a "María de Maeztu Unit of Excellence", the highest recognition of scientific excellence in Spain awarded by the Spanish State Research Agency (AEI) - which further confirms this recognition.

At a Glance



2020 Organization

1

Research Groups

- 1 Glycotechnology
- 2 Biomolecular Nanotechnology
- 3 Soft Matter Nanotechnology
- 4 Bionanoplasmonics
- 5 Bioengineered Particles
- 6 Carbon Bionanotechnology
- 7 Heterogeneous Biocatalysis
- 8 Regenerative Medicine
- 9 Computational Biophysics
- 10 Radiochemistry & Nuclear Imaging
- 11 Magnetic Resonance Imaging
- 12 Molecular & Functional Biomarkers

2

Molecular & Functional Imaging Facility

- 1 Radiochemistry
- 2 Nuclear Imaging (PET/SPECT/CT)
- 3 Magnetic Resonance Imaging (MRI)
- 4 Image Analytics
- 5 Animal House

3

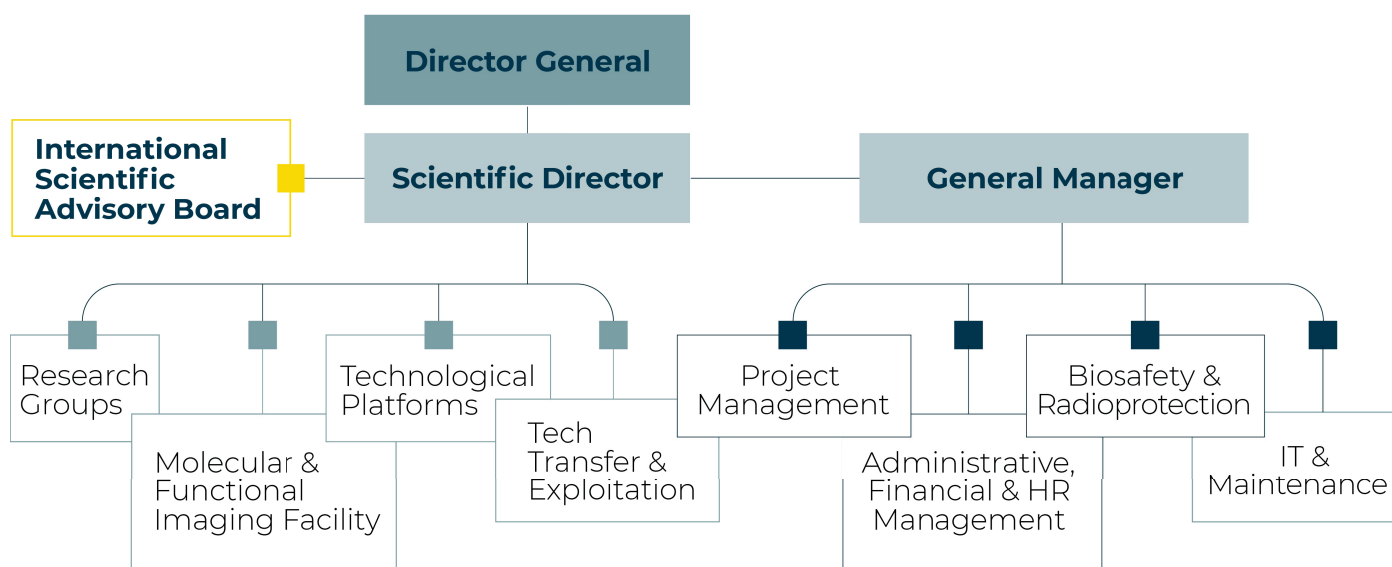
Technological Platforms

- 1 Nuclear Magnetic Resonance
- 2 Electron Microscopy
- 3 Mass Spectrometry
- 4 Surface Analysis & Fabrication
- 5 Colloidal Nanofabrication
- 6 Optical Spectroscopy

4

Support

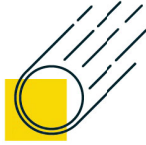
- 1 Direction
- 2 General Management
- 3 Administration, Financial & HR Management
- 4 Project Management
- 5 Tech Transfer & Exploitation
- 6 Biosafety & Radioprotection
- 7 Information Technology
- 8 Maintenance



Scientific Output



188
Scientific
publications



8.49
Average
impact factor



87
HIRSCH
index



8736
Citations

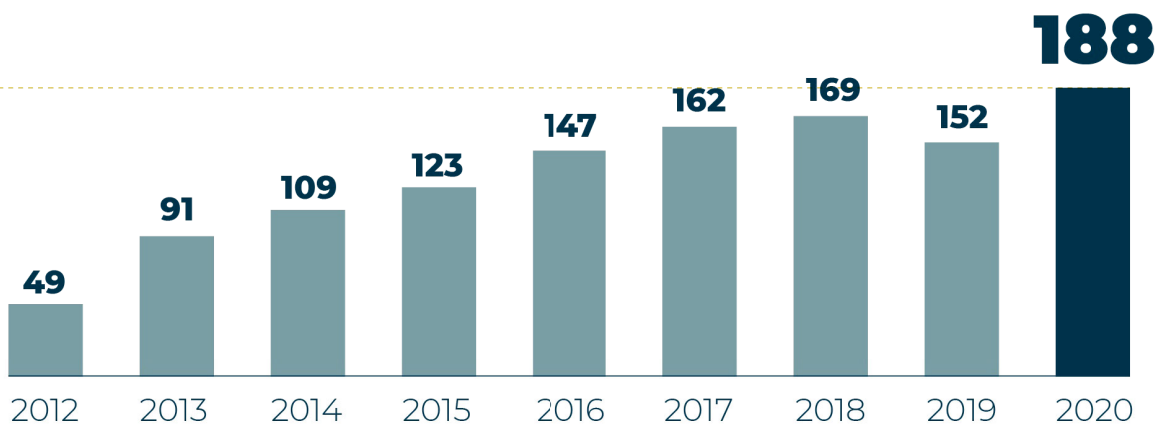


84%
1st Quartile
(JCR)



45%
1st Decile
(JCR)

Publications



Publications by gender

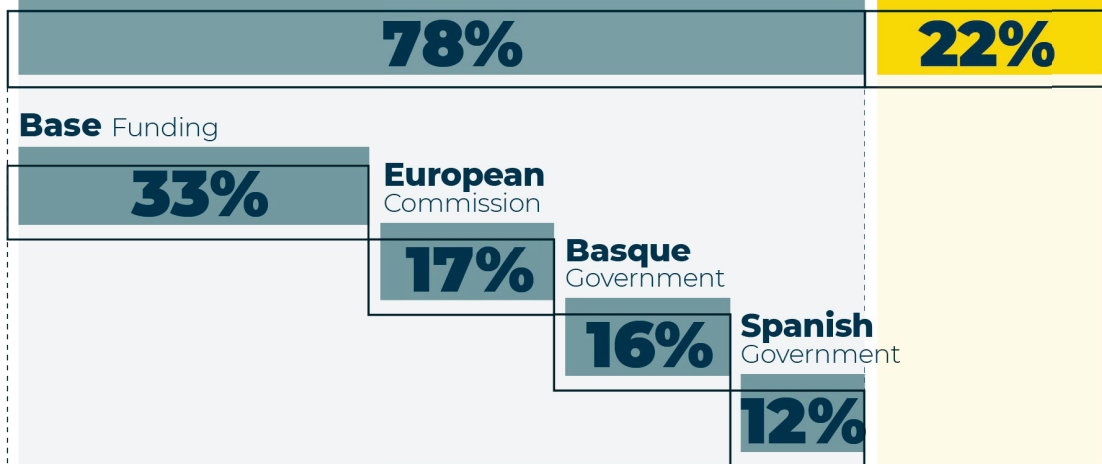
Publications	Total	Gender	
		Male (♂)	Female (♀)
1 st authorship	56	30	26
Corresponding author	79	66	13

Funding

Total Funding: 11,868,675€

Public

Private



Technology Transfer

3 New Patent Applications



1 Granted Patent



17 Agreements with Industrial or Clinical Partners

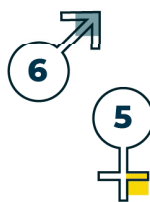


Training and Outreach Activity



11

Completed PhD Theses



33

Ongoing PhD Theses



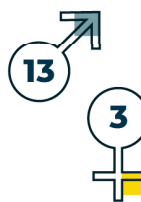
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Received research stays



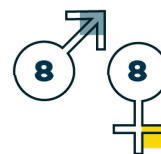
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Outgoing research stays



16

Seminars



12

Outreach activities



478
Impacts in media

AWARDS & RECOGNITION

Accreditations

AAALAC Accreditation to CIC biomaGUNE's animal facilities

CIC biomaGUNE received the AAALAC accreditation in 2015 for the first time and the accreditation was renewed in 2018.

Maria de Maeztu Unit of Excellence accredited by the Spanish State Research Agency.

The Molecular & Functional Imaging Facility remains accredited as **Singular Scientific and Technical Infrastructure** (ICTS in Spanish), as a node of the ReDIB network.

Certification of CIC biomaGUNE RD&I management system according to **UNE 16602:2014** standard.



Awards

Maurizio Prato,

awarded with the prestigious **ERC-AdG** for his project e-DOTS.
31/03/2020



Luis M. Liz-Marzán,
2020 SCF French-Spanish "Miguel Catalán-Paul Sabatier" Prize in recognition

of his eminent works in the application of colloid chemistry to the field of nanoplasmonics. It is also in recognition of the strong links that he established with the French chemists.

30/06/2020



Pedro Ramos-Cabrer,

awarded with the **XVIII Research Prize of the Medical College of Córdoba**, as one of the 3 best research publications during the year 2019, co-authored by at least one doctor of Spanish nationality.

18/11/2020



Wolfgang J. Parak,
Highly Cited researcher

(Clarivate Analytics) in the Cross-field category.

20/11/2020



Luis M. Liz-Marzán,
Highly Cited researcher

(Clarivate Analytics) in the Cross-field category.

20/11/2020



Best Poster



Pedro Ramos-Cabrer

The 15th European Molecular Imaging Meeting (vEMIM) has awarded the **“Best v-EMIM Poster-Pitches”** prize to the work “Longitudinal rs-fMRI study of functional alterations during demyelination and remyelination in the cuprizone murine model” from The Magnetic Resonance Imaging Lab.

24/08/2020



Rossana Passannante

The work entitled “Pharmacokinetics evaluation of new drugs with potential application in Duchenne muscular dystrophy”, presented by Rossana Passannante, PhD student of the Radiochemistry and Nuclear Imaging Group received the award for the **Best Imaging Probes & Applications Poster-Pitch** within the 15th European Molecular Imaging Meeting-EMIM2020. Best Imaging Probes & Applications Poster-Pitch.

01/09/2020

Academy Membership



Luis M. Liz-Marzán, joins the **Royal Galician Academy of Sciences** (RAGC - Real Academia Gallega de Ciencias) as a Corresponding Member.

21/01/2020



Fernando López-Gallego, Ikerbasque Professor at CIC biomaGUNE joins the **Young Academy of Spain.**

04/06/2020



Organization



General Assembly

Public Administration



Companies



International Scientific Advisory Board



Prof. Peter Morris

Sir Peter Mansfield
Magnetic Resonance
Centre
University of
Nottingham, UK



Prof. Monica Olvera de la Cruz

Department of
Chemistry
Northwestern
University, USA



Prof. Itamar Willner

Institute of Chemistry
The Hebrew
University of
Jerusalem, Israel



Prof. Peter Seeberger

Max-Planck Institute
of Colloids and
Interfaces,
Germany



Prof. Aránzazu del Campo

INM - Leibniz
Institute for New
Materials, Germany



Prof. Samuel I. Stupp

Institute for
BioNanotechnology
in Medicine
Northwestern
University, USA



Prof. Patrick Couvreur

Université
Paris-Sud,
France

Research Groups

The main research lines revolve around the design, preparation and characterization of biofunctional nanostructures, to be used in the study of biological processes and the development of biomedical tools.

Soft Matter Nanotechnology

Sergio Moya - *Principal Investigator*

The Soft Matter Nanotechnology Laboratory makes use of elements of soft matter, mainly polyelectrolytes, in nanofabrication and in the development of hybrid materials for biomedical applications.

The group has expertise in several physico-chemical characterization techniques, especially in fluorescence spectroscopy. The group interests include the synthesis of polyelectrolytes, self-assembly, physical characterization, the development of drug delivery systems, and hybrid materials for tissue engineering.

Biomolecular Nanotechnology



Aitziber L. Cortajarena - *Principal Investigator (Ikerbasque Professor)*

Ivan R. Sasselli - *Research Associate (Fellow Gipuzkoa)*

The group focuses on protein engineering toward the generation of functional nanostructures and bioinspired materials for applications in nanobiotechnology and nanomedicine. The research focuses mainly on protein engineering in order to develop versatile platforms for the bottom-up fabrication of protein-based hybrid functional biomaterials. We are also interested in the tailored biofunctionalization of nanomaterials for biomedical applications, from disease treatment to diagnosis.

The group also carries out research aimed at the development of new analytical and bioanalytical techniques, using metal and semiconductor nanoparticles and has also focused on the fabrication of novel biosensors employing different read-out methods, such as UV-visible and fluorescence spectroscopy, quartz crystal microbalance, electrochemistry and photo-electrochemistry.

Glycotechnology

Niels Reichardt - *Principal Investigator*

Sonia Serna - *Research Associate*

The Glycotechnology Laboratory carries out projects in basic and applied glycoscience, the science and technology of carbohydrates with a large untapped potential to provide innovative solutions to important social challenges such as personalized medicine, pharmaceutical products, food and biomaterials.

The group applies carbohydrate synthesis, materials science and molecular biology to the design of tools, probes and devices to elucidate the role and exploit the potential of sugars for cancer immune therapy, as biomarkers and biomaterials for biomedical applications.

Bionanoplasmonics



Luis M. Liz-Marzán - *Principal Investigator (Ikerbasque Professor)*

Isabel García-Martin - *Research Associate (CIBER-BBN)*

Dorleta Jiménez de Aberasturi - *Research Associate (Ikerbasque Fellow)*

Oscar F. Silvestre - *Research Associate (Fellow Gipuzkoa)*

Malou Henriksen-Lacey - *Research Associate*

The activity of the Bionanoplasmonics Laboratory focuses on the biomedical applications of plasmonic nanomaterials, including new chemical methods for the synthesis of colloidal metal nanoparticles with tailored size, shape and surface chemistry, their directed self-assembly and applications in biosensing, diagnostics and therapy, mainly based on plasmonic effects. One of the current central topics of the group is the development of platforms that can be used for ultrasensitive detection based on SERS. The group is interested in the incorporation of such nanostructured substrates within devices for implementation of real detection techniques.

Bioengineered Particles

Wolfgang J. Parak - *Principal Investigator*

Carlos Sánchez-Cano - *Research Associate (Fellow Gipuzkoa)*

The Bioengineered Particles Laboratory focuses on understanding the interaction of colloidal nanomaterials with the biological matter, such as proteins and cells.

Our work is dedicated to the synthesis of highly defined nanoparticle libraries, their physicochemical characterization, and correlation of biological effects to their physicochemical properties. We also develop new methods toward novel methodologies for physicochemical characterization *in situ* and in complex environments.

Carbon Bionanotechnology



Maurizio Prato - *Principal Investigator (Ikerbasque Professor & AXA Chair)*

The mission of the Carbon Bionanotechnology Laboratory is the design and synthesis of tailored carbon nanostructures for bio-nanotechnology applications and solar energy conversion through biomimetic approaches.

The group explores new synthetic protocols and new analytical methods, enabling innovative, controlled and reproducible ways toward the designer functionalization of carbon nanostructures, such as fullerenes, carbon nanotubes, graphene and carbon nanodots.

Heterogeneous Biocatalysis



Fernando López-Gallego - *Principal Investigator (Ikerbasque Professor)*

The Laboratory of Heterogeneous Biocatalysis is applying multi-enzyme systems to synthetic, environmental, medical and analytical chemistries by harnessing the exquisite selectivity of enzymes (biological catalysts) for the development of more sustainable and effective chemical processes. We are mimicking the spatial organization found inside the living organisms, but using ex-vivo systems supported on solid materials. To address such goal, we are interfacing chemistry and biology utilizing multidisciplinary tools that involve molecular biology, enzymology and materials chemistry.

Regenerative Medicine

Ander Abarategi - *Junior Group Leader (Ikerbasque and Ramón y Cajal Fellow)*

The Regenerative Medicine Laboratory uses biomaterial-based approaches to boost knowledge in stem-cell biology, both in physiological and in pathological contexts. For this aim, we generate bioactive and cell-laden 3D structures potentially useful for regenerative medicine and disease modelling studies.

The understanding of bone tissue is the core of our research. Briefly, we design, characterize and test different kinds of implantable devices to gain insight into specific tissue formation processes. From this information we define and modulate relevant mechanisms in the context of tissue regeneration and tissue pathology.

Computational Biophysics

Ivan Coluzza - *Principal Investigator (Ikerbasque Professor)*

Ivan R. Sasselli - *Research Associate (Fellow Gipuzkoa)*

The Computational Biophysics Laboratory is composed by an interdisciplinary team of scientists from different backgrounds but all with experience in computational modeling of biological systems and statistical mechanics.

Our research focuses on the application of statistical mechanics to soft-matter and complex biological systems.

Our goal is to build simple models of natural complex systems, such as proteins, and in doing so learn their fundamental function and copy it into artificial systems.

Radiochemistry & Nuclear Imaging

Jordi Llop - *Principal Investigator*

The activity of the Radiochemistry and Nuclear Imaging Laboratory focuses on the development of innovative radiochemistry and the application of positron emission tomography (PET) and single photon emission computed tomography (SPECT) tracers toward the investigation of biological, physiological and pathological processes in the fields of oncology, neurology, pneumology, infection and cardiovascular diseases.

Magnetic Resonance Imaging

Pedro Ramos-Cabrer - *Principal Investigator (Ikerbasque Professor)*

The Magnetic Resonance Imaging (MRI) Laboratory makes use of nanomaterials and magnetic resonance imaging techniques on animal models.

On one hand, we intend to characterize the onset and evolution of diseases of the central nervous system (CNS), from development of early markers to imaging methods that quantify the progression of the pathological processes and their consequences at anatomical and functional levels.

We additionally develop new therapeutic approaches to treat such diseases, with special emphasis on the penetration through the blood- brain-barrier and monitoring the effective release of drugs in the brain parenchyma.

Molecular & Functional Biomarkers

Jesús Ruiz-Cabello - *Principal Investigator (Ikerbasque Professor)*

Susana Carregal-Romero - *Research Associate (CIBER-BBN)*

The Molecular & Functional Biomarkers Laboratory studies cardio-pulmonary and vascular diseases through functional and molecular imaging and system biology approaches.

The group is particularly interested in the potential of new imaging techniques, including nanotechnology-based applications, in early diagnosis of pulmonary and cardiovascular remodelling, the assessment of metabolic changes associated with cell growth, the structure and function of the right ventricle and cardiovascular coupling signals.

Directorate & Management Area

Directorate

José M. Mato - *Director General*

Luis M. Liz-Marzán - *Scientific Director*

Design, define and coordinate the Center's scientific strategies and activities.

R&D&I Management Unit

Cristina Díez García - *Project Manager*

Marcos Simón Soria - *Technology*

Transfer Manager

A dedicated office to support and strengthen the capacities of the Center, in terms of attracting funding from various Research Programs, in particular, international ones, strengthening links between academic and industrial environments, and promoting the transfer of research results to society and industry, especially to the biotechnology sector.

Maintenance

Álvaro Ruiz Fernández - *Maintenance Manager*

This department takes care of the preventive, predictive and corrective maintenance of all facilities at CIC biomaGUNE.

General Management

Anna Llanes Pallàs - *General Manager*

The General Manager is responsible for supervising the management of the Administration Department, Project Management, as well as the IT, Maintenance and Biosafety units of the Center.

Administration

Sheyla García Medel - *Administration & HR Manager*

Elizabeth Noguera Olaechea - *Finance & Control Manager*

This department is responsible for the management of finances, accounting, administration, and the human resources of the Center.

Biosafety & Radioprotection

Paola Ferreira Cabeza - *Biosafety & Radioprotection Manager*

Dedicated to establish safe working conditions of all CIC biomaGUNE's personnel by promoting good laboratory practices. The service is also in charge of the appropriate operation of the Center's Radioactive Facility.

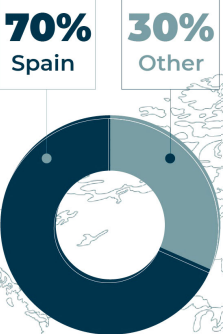
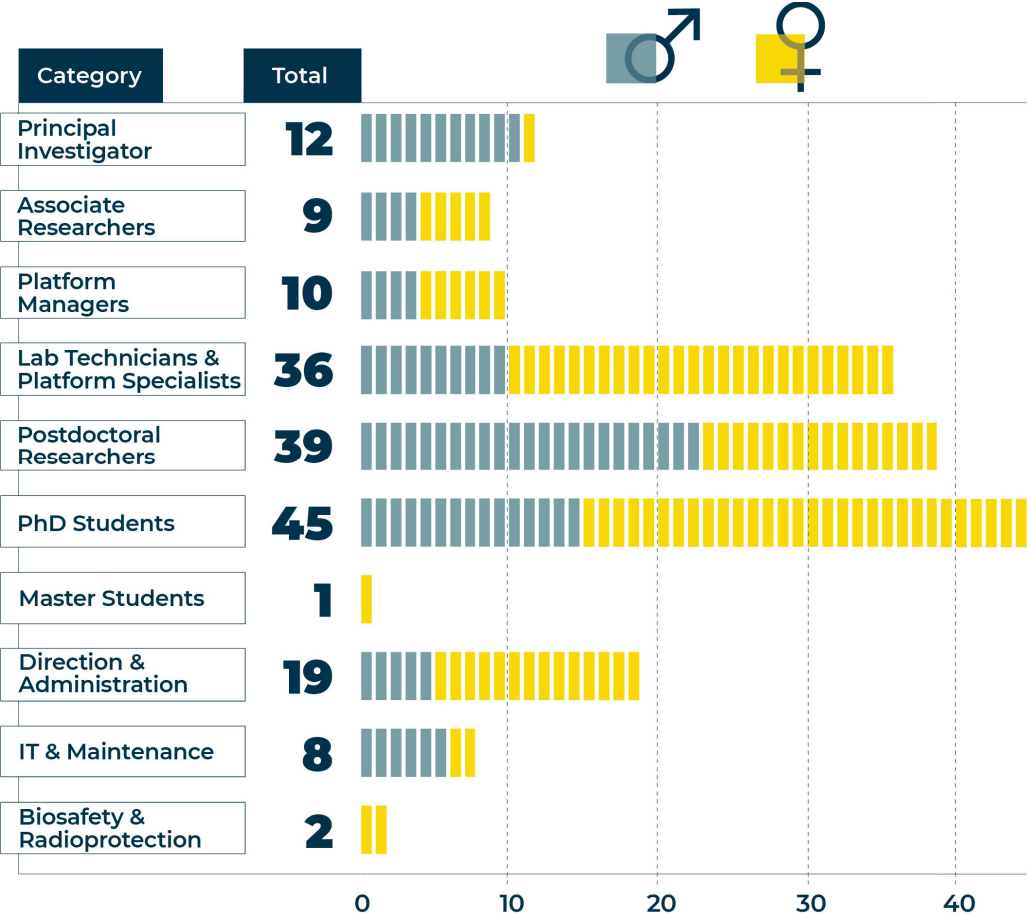
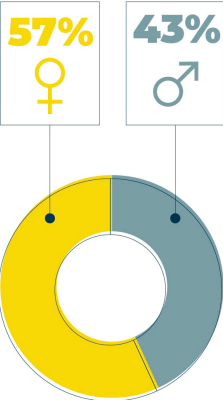
Computing & Communications

Mikel Gonzalez Lacunza - *IT Manager*

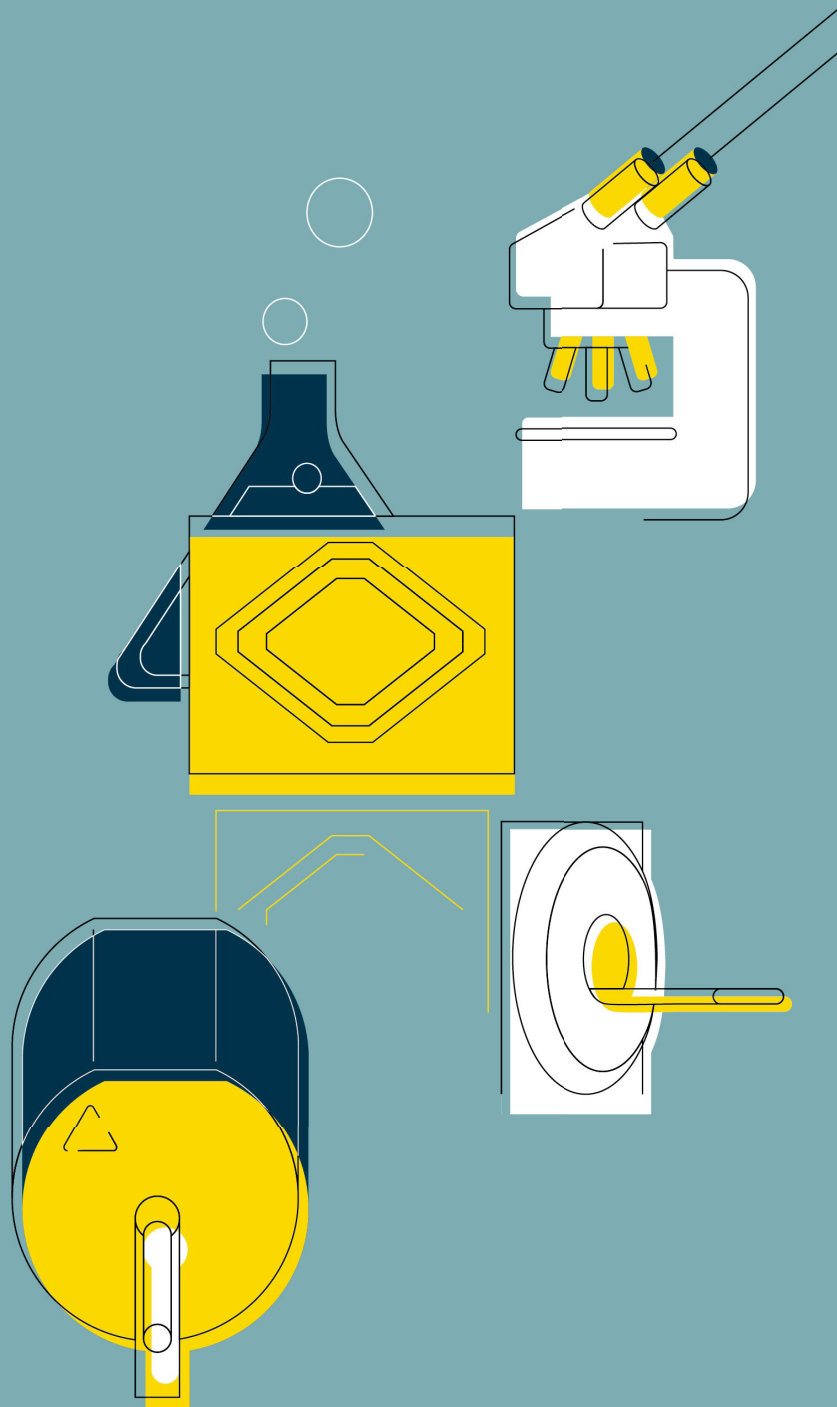
The IT service is in charge of supporting the staff of the Center with setting up and maintaining computer-related equipment, software, data storage, e-mail servers, as well as the website and other social media.

CIC biomaGUNE's Personnel during 2020

Gender distribution:



Facilities

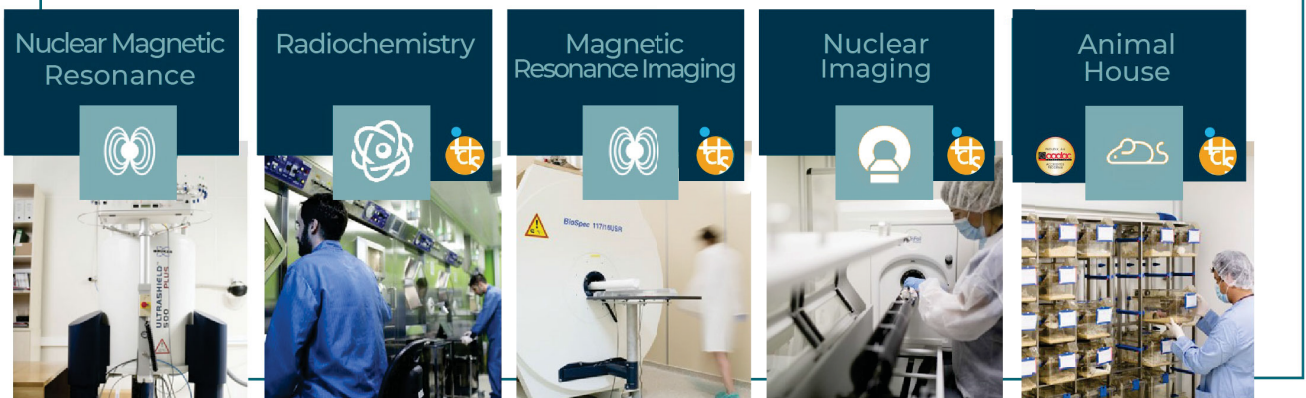


Research Facilities

All research lines, framed within the strategic research program of CIC biomaGUNE, are strongly supported by the Molecular & Functional Imaging Facility and the Technological Platforms, which constitute a major strength of the Center.

CIC biomaGUNE Technological Platforms & Molecular Imaging Facility

CIC biomaGUNE's state-of-the art facilities are depicted in the images below.



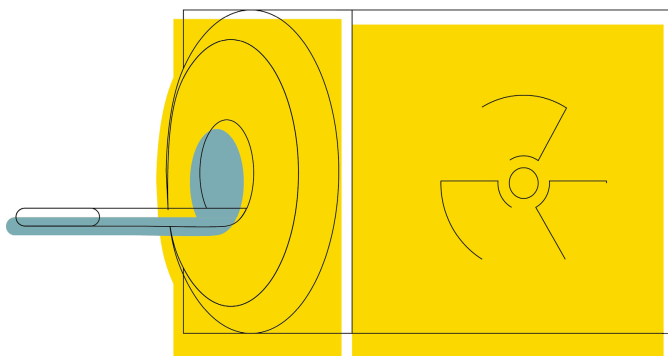
Molecular & Functional Imaging Facility

Housed within 900 m², the Molecular and Functional Imaging Facility at CIC biomaGUNE is an integrated bioimaging structure that offers state-of-the-art preclinical imaging instrumentation in Positron Emission Tomography (PET), Single Photon Emission Computed Tomography (SPECT), Computerized Tomography (CT), Magnetic Resonance Imaging (MRI), Optical/Fluorescence and Ultrasound (US) Imaging. It includes a fully equipped radiochemistry laboratory with a biomedical cyclotron, advanced microscopy equipment, and dedicated animal housing facility for rodents which holds AAALAC accreditation. The Facility is currently integrated in the "Distributed Biomedical Imaging Network" (ReDIB, www.redib.net), recognized by the Spanish Government as a Singular Scientific and Technical Infrastructure (ICTS). The infrastructure has been designed, built and equipped to tackle longitudinal and multimodal pre-clinical projects and to develop applications in the area of Preclinical Molecular and Functional Imaging and Nanomedicine.

Nuclear Imaging

Unai Cossío - Platform Manager

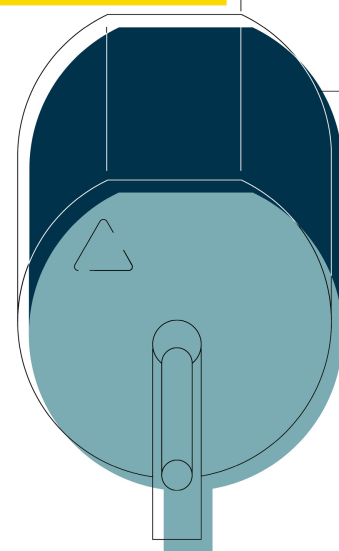
Equipped with a hybrid PET-CT (eXplore Vista-CT) a full ring SPECT-CT (eXplore speCZT CT 120), the latter offering the possibility of multi-isotope studies with energy discrimination, and a trimodal PET-SPECT-CT.



Magnetic Resonance Imaging (MRI)

Daniel Padró - Platform Manager

Instrumentation to conduct advanced imaging and spectroscopic experiments applied to biological samples including small rodents, samples or tissue extracts and cell cultures is available. CIC biomaGUNE provides the instrumentation and the expertise to carry out a wide range of MRI and MRS experiments, and is equipped with surgery rooms for animal preparation and implementation of surgical models. Ancillary equipment is also available: anesthesia systems, MRI-compatible physiological monitoring systems, infusion pumps, and temperature regulation systems. Available equipment: MRI 7T/30 cm (70/30 USR), MRI 11.7T/16 cm (117/16 USR).





Radiochemistry Platform

Vanessa Gómez-Vallejo - Platform Manager

The platform is equipped with an IBA Cyclone 18/9 cyclotron able to accelerate protons (18 MeV) and deuterons (9 MeV) and is equipped with 7 targets for the routine production of $[^{18}\text{F}] \text{F}$, $[^{18}\text{F}] \text{F}_2$, $[^{13}\text{N}] \text{-NH}_4^+$, $[^{15}\text{O}] \text{-O}_2$, $[^{11}\text{C}] \text{-CO}_2$ and $[^{11}\text{C}] \text{-CH}_4$. It also has a solid target for the production of ^{89}Zr and ^{64}Cu .

The radiochemistry laboratory equipped with 5 shielded hot cells housing versatile automatic synthesis, suitable for the production (synthesis, purification and quality control) of PET and SPECT radiotracers. The facility has specially designed modules for:

- Synthesis of $[^{11}\text{C}] \text{CH}_3\text{I}$ / $[^{11}\text{C}] \text{CH}_3\text{OTf}$ from $[^{11}\text{C}] \text{CO}_2$ / $[^{11}\text{C}] \text{CH}_4$, and subsequent methylation reaction.
- ^{18}F -fluorination by nucleophilic and electrophilic substitution.
- Radiotracer synthesis using microfluidics technology.
- Chelation reactions using radiometals (^{68}Ga , ^{67}Ga , ^{64}Cu , ^{89}Zr , etc.).

The quality control lab, sited into the production lab, is equipped with state of art equipment to perform complete quality control of synthesized radiotracers, including radio-HPLC, radio-GC, radio-TLC, and gamma spectrometry.

Pre-Clinical Analytics

Unai Cossío - Platform Manager

The Image Analytics service takes care of processing all the outcoming multimodal images obtained within the Molecular Imaging Unit (PET, SPECT, CT, and MRI).

Working on different operating systems, we carry out co-registration, segmentation, and quantification of multimodal images. The combination of all multimodal imaging techniques confined in the Imaging Unit with a reliable image analysis process offers a complete and powerful imaging facility to researchers. Four workstations and a data storage system in the Terabyte scale enable image reconstruction, processing, quantification and archiving.

Animal Facility

Ainhoa Cano - Platform Manager

The MRI Unit and the Nuclear Imaging Unit sandwich a dedicated animal housing area, which holds accreditation of the **Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC)** and is prepared to house up to 800 mice and 400 rats in individually ventilated cages, with an experimental area specifically devoted to perform longitudinal studies. The animal house is complemented with microsurgery areas for animal preparation.

Technological Platforms

Managed by specialized Platform Managers, they provide technical and scientific support to the research activities conducted at CIC biomaGUNE. They include the following state-of-the-art research infrastructures:

Mass Spectrometry

Javier Calvo - Platform Manager

Equipped with **MALDI-TOF, ICP-MS**, it provides several high quality mass spectrometry techniques for the analysis of small molecules, complex biomolecules and nanomaterials. The platform is equipped with modern instrumentation and offers different ionization methods.

Electron Microscopy

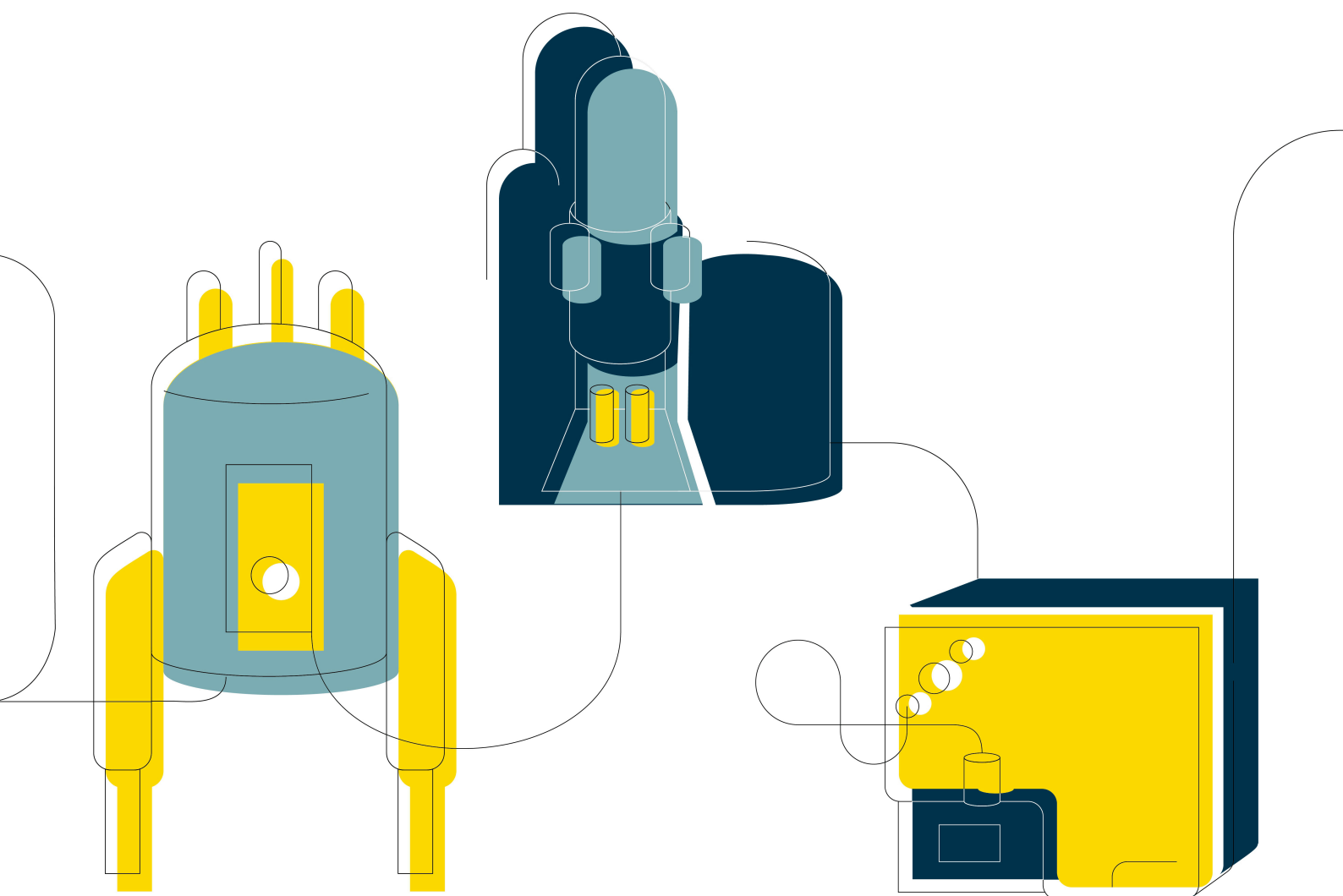
Marco Möller - Platform Manager

Equipped with **SEM-EDX, TEM - 120 keV and 200 keV**, offers techniques to study nanoparticles and biological or soft polymer materials (cryo-TEM) at the micrometer and nanometer scale to determine the materials dimensions, shape and composition.

Nuclear Magnetic Resonance (NMR)

Daniel Padró - Platform Manager

Equipped with a **500 MHz NMR spectrometer**, it provides essential service for the characterization of molecules with biological activity, from complex glycans to molecules used in the design of nanostructures for biomedical applications.



Surface Analysis & Fabrication

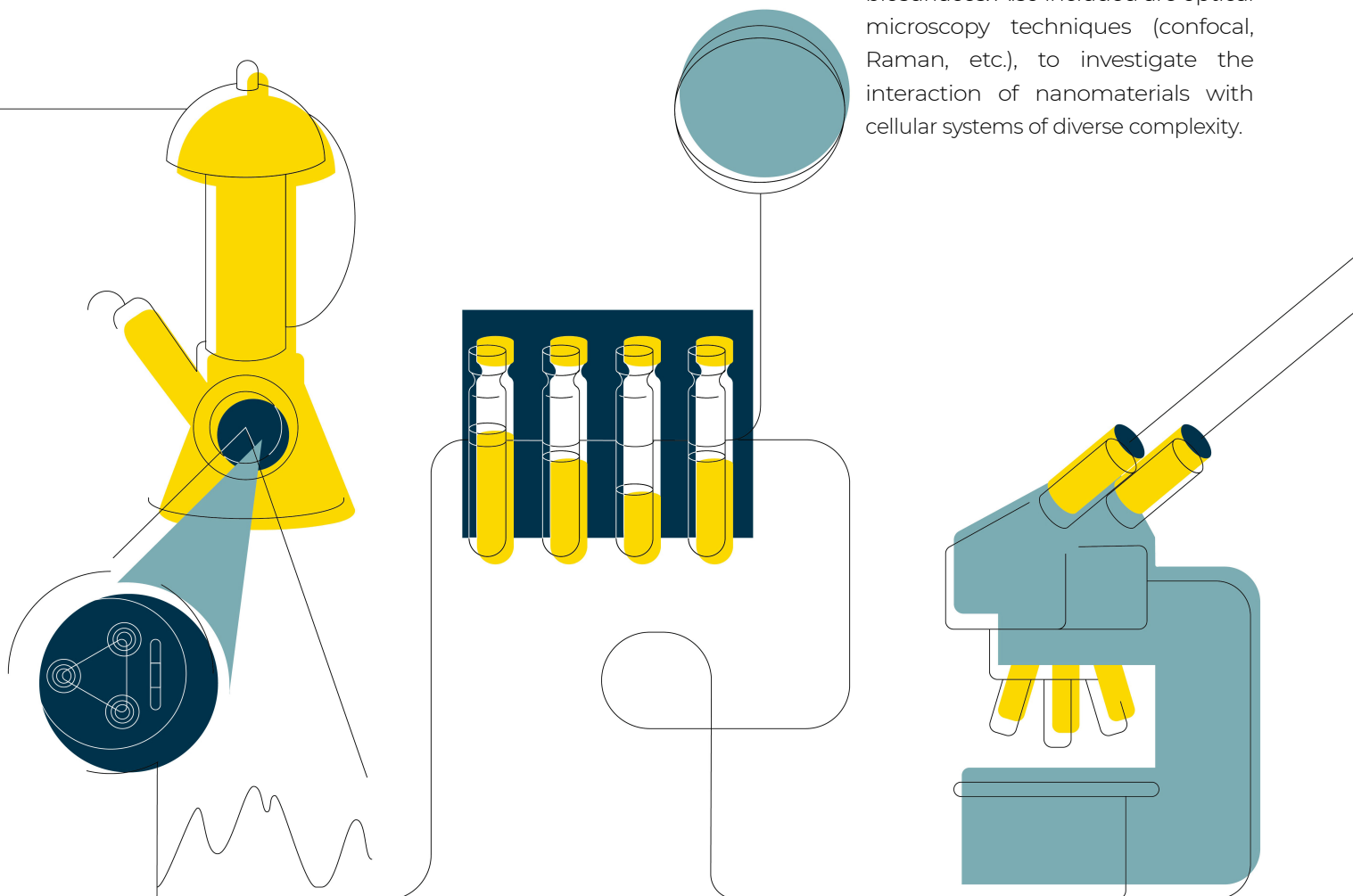
Desiré Di Silvio - Platform Manager
Equipped with **XPS, 3 x AFM, sputtering system**, it focuses on the analysis of materials at the surface level, including spectroscopic and microscopic techniques especially suited to surfaces. The platform offers also services for the deposition of thin layers with controlled manufacture at the nanoscale. .

Colloidal Nanofabrication

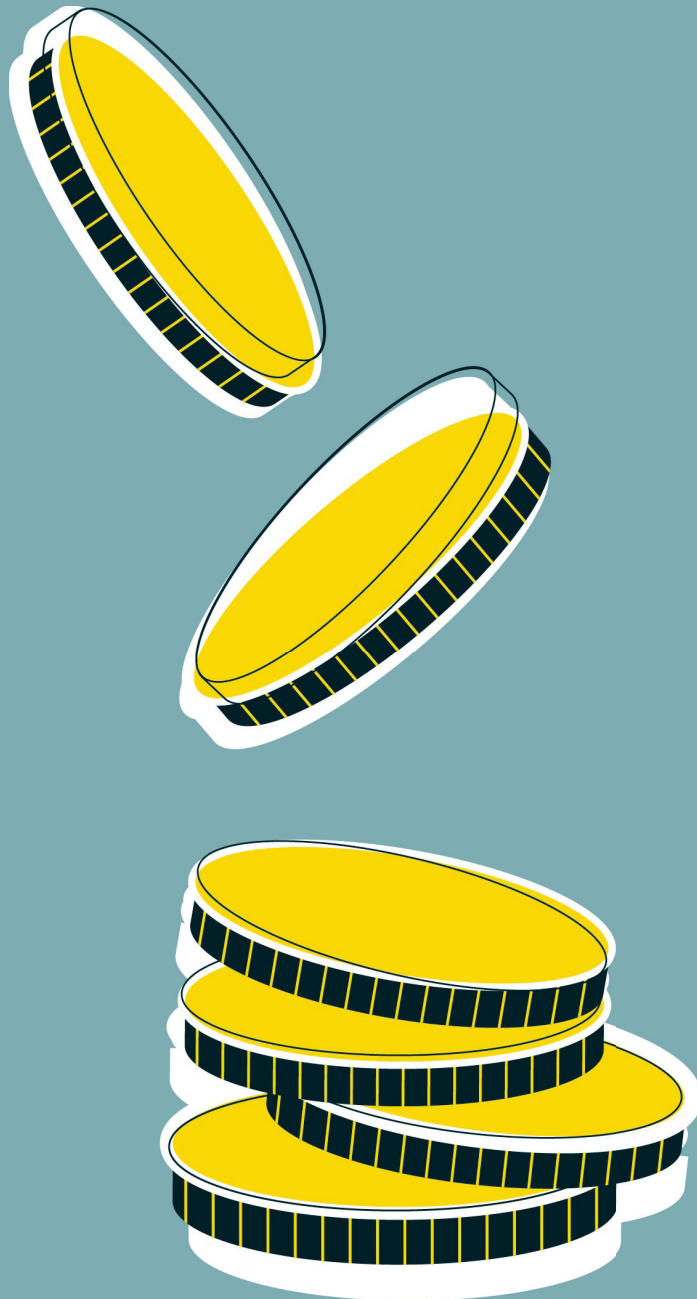
Ana Sánchez-Iglesias - Platform Manager
Within the priority area of biofunctional nanomaterials and nanomedicine, colloidal synthesis plays an essential role. This platform provides knowledge, training and service for the manufacture of nanoparticles with a wide variety of compositions and morphologies.

Optical Spectroscopy & Imaging

Irantzu Llarena - Platform Manager
Judith Langer - Platform Manager
Equipped with **2 x Confocal, and 2 x Confocal-Raman microscopes, UV-VIS-NIR, and FT-IR spectrometers, Fluorimeter, Flow Cytometer, Cell Observer, CD, DLS, DCS, ITC, TGA, SPR**, this platform offers a wide variety of techniques for the spectroscopic characterization of biomaterials and biosurfaces. Also included are optical microscopy techniques (confocal, Raman, etc.), to investigate the interaction of nanomaterials with cellular systems of diverse complexity.



Funding



The total funding for 2020 has amounted **11,868,675€**
45 new projects (from competitive funding sources)
 have been launched in 2020 with a
total contribution of **7,731,721€**



CALL	PI (Fellow)	Full Title	Period	Amount (€)
Elkartek 2019 - 2020	Jesús Ruiz-Cabello	biomaGUNE 2019 - Biomarcadores para el diagnóstico precoz y seguimiento de tratamiento en hipertensión pulmonar	2020-2021	576,430.90
Elkartek 2020 - 2020	Sergio Moya	biomaGUNE 2020 - Desarrollo de vectores no virales para terapia génica con aplicaciones oncológicas y en inmunoterapia	2020-2021	1,020,336.80
Ayudas a proyectos de investigación y desarrollo en salud 2020	Aitziber L. Cortajarena	Glioblastoma - Medicina personalizada en tumores cerebrales: desarrollo y validación de estrategias terapéuticas basadas en la inhibición de la auto-renovación	2020	13,460.40
Ayudas a proyectos de investigación y desarrollo en salud 2020	Aitziber L. Cortajarena	NKTPH - Papel de las células NK en el trasplante de precursores hematopoyéticos autólogo en el tratamiento de cáncer y enfermedades raras	2020	22,336.10
Ayudas a proyectos de investigación y desarrollo en salud 2020	Ander Abarrategi	Fragilidad - Validación de un patrón molecular para el diagnóstico y estratificación de la fragilidad	2020	11,202.21
Ayudas a proyectos de investigación y desarrollo en salud 2020	Ander Abarrategi	EXA MINA - Dolor y pérdida de la capacidad funcional en las personas mayores: Desarrollo de procedimientos y tecnologías para su valoración integral	2020	12,223.16
BIKAINTEK2020 - Contratación de doctores	Aitziber L. Cortajarena/Ivan Coluzza (Giulia Magi Meconi)	SwitchProt - Diseño de novo de andamios de proteínas con estructuras intercambiables	2020-2022	46,471.68
BIKAINTEK2020 - Contratación de doctores	Fernando López-Gallego (Alejandro Herrero Orrero)	KIMICoA - Fabricación de biocatalizadores heterogéneos multifuncionales para la síntesis sostenible de precursores de coenzima A con aplicaciones en química fina y médica	2020-2022	46,471.68
Ayudas urgentes I+D COVID-19_2020	Niels C. Reichardt	Biochip COVID-19 - Desarrollo de microarrays de anticuerpos y antígenos como plataforma para el diagnóstico y estudio epidemiológico de Covid-19	2020	104,123.38
Ayudas urgentes I+D COVID-19_2020	Aitziber L. Cortajarena	Nano-CoV - Plataformas nanotecnológicas para la detección rápida de anticuerpos anti-SARS-CoV-2: diagnóstico y evaluación de desarrollo de inmunidad	2020	90,000.00
Equipamiento Científico_EKIZIEN 2020	Maurizio Prato	Espectrómetro de infrarrojo (IR) por Transformada de Fourier (FT)	2020	90,000.00

CALL	PI (Fellow)	Period	Amount (€)
Ayudas para contratos predoctorales 2019	Aitziber L. Cortajarena (Laura Pérez)	2020-2024	98,250.00
Ayudas para contratos predoctorales 2019	Jordi Llop (Óscar Moreno)	2020-2024	98,250.00
Ayudas para contratos predoctorales 2019	Fernando López-Gallego (Francisco Javier Santiago-Arcos)	2020-2023	98,250.00
Juan de la Cierva - Formación 2018	Luis M. Liz-Marzán (Xiaolu Zhuo)	2020-2022	50,000.00
Juan de la Cierva - Formación 2018	Maurizio Prato (Alessandro Silvestri)	2020-2022	50,000.00
Juan de la Cierva - Incorporación 2018	Maurizio Prato (Huilei Hou)	2020-2023	93,000.00
Ramón y Cajal 2018	Ander Abarrategi	2020-2024	208,600.00

CALL	PI	Full Title	Period	Amount (€)
Proyectos de I+D+i 2019 "Retos Investigación"	Aitziber L. Cortajarena	ProTOOLS - Protein engineering to generate advanced tools for biomedical and biotechnological applications	2020-2023	175,450.00
Proyectos de I+D+i 2019 "Retos Investigación"	Maurizio Prato	Multi-DOTS - Tailored Carbon Nanodots as Novel and Safe Multifunctional Materials for Nano- and Bio- Applications	2020-2023	181,500.00
Proyectos de I+D+i 2019 "Retos Investigación"	Dorleta Jiménez de Aberasturi	InOrINK-3D - Smart bioinks based on multifunctional inorganic-organic composites and application to a 3D-printed pulmonary artery model	2020-2023	96,800.00
"Redes de Investigación" 2018	Fernando López-Gallego	REDBIOCAT - Red temática de biocatálisis y tecnología enzimática; soluciones hacia una química sostenible	2020-2022	6,000.00
"Redes de Investigación" 2018	Luis M. Liz-Marzán	SOMMa+ - Alianza de Centros Severo Ochoa y Unidades Maria de Maeztu - SOMMA	2020-2021	
"Redes de Investigación" 2018	Jesús Ruiz-Cabello	nanoCARE - Red de nanomedicina para el diagnóstico y tratamiento de enfermedades de alto impacto social: cancer, aterosclerosis y enfermedades infecciosas	2020-2021	
"Redes de Investigación" 2018	Aitziber L. Cortajarena	BIONAPEP - Red de Péptidos en Biomedicina y Nanociencia	2020-2021	

CALL	PI	Full Title	Period	Amount (€)
ERC-CoG-2018	Fernando López-Gallego	METACELL - Artificial metabolic cells for biomanufacturing of bio-based chiral fine chemicals	2020-2024	1,995,894.00

CALL	PI	Full Title	Period	Amount (€)
H2020 H2020-NMBP-ST-IND-2018-2020	Maurizio Prato	GrapheneCore3 - Graphene Flagship Core 3	2020-2023	363,750.00
H2020 H2020-SGA-FET-GRAPHENE-2017	Maurizio Prato	DECADE - DistributEd Chemicals And fuels production from CO ₂ in photoelectrocatalytic Devices	2020-2024	320,746.25
H2020-FETOPEN-2018-2020	Aitziber L. Cortajarena	ARTIBLED - Engineered Artificial Proteins for Biological Light-Emitting Diodes	2020-2023	484,636.25
H2020-FETOPEN-2018-2020	Luis M. Liz-Marzán	POSEIDON - NanoPhOtonic devices applying SElf-assembled colloIDs for novel ON-chip light sources	2020-2023	246,031.25
H2020-MSCA-ITN-2019	Jesús Ruiz-Cabello	NOVA-MRI - Novel Applications in 19F Magnetic Resonance Imaging	2020-2024	250,904.88
H2020-MSCA-ITN-2019	Fernando López-Gallego	INTERfaces - Heterogeneous biocatalytic reaction cascades training network	2020-2023	250,904.88

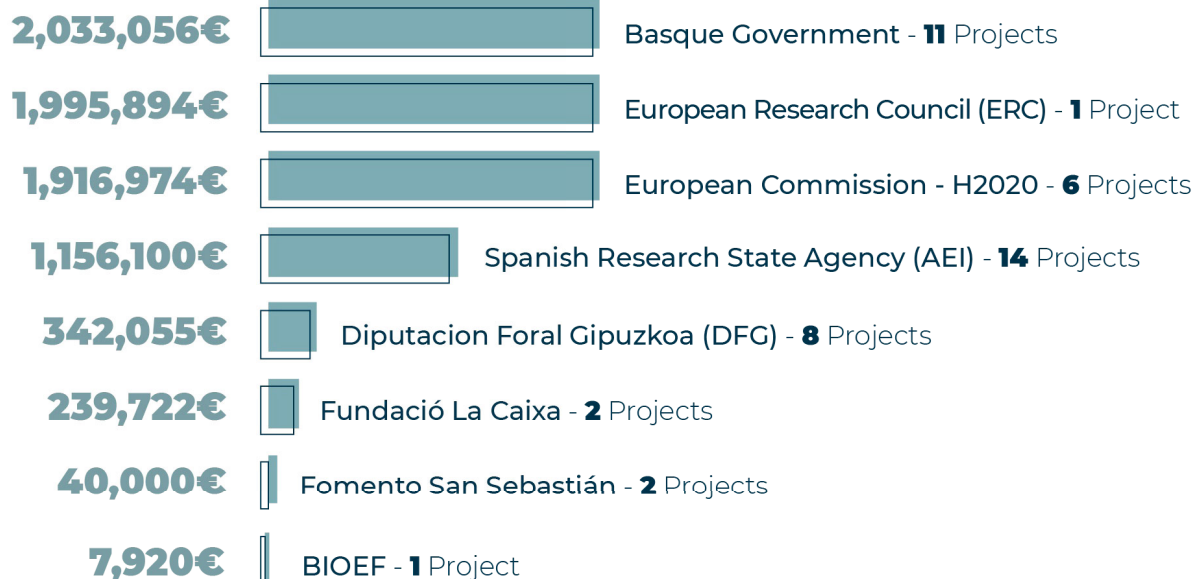
CALL	PI (Fellow)	Full Title	Period	Amount (€)
Programa RED – Investigación 2020	Pedro Ramos-Cabrer	BBB-trans - Biomateriales y protocolos efectivos para el transporte de fármacos al sistema nervioso central	2020-2021	90,804.00
Programa RED – Investigación 2020	Aitziber L. Cortajarena	Espectrofluorímetro - Adquisición de una Espectrofluorímetro	2020-2021	47,150.00
Programa Fellows Gipuzkoa 2020	Wolfgang Parak (Carlos Sánchez-Cano)	NanoBioMeSi - Nano-materiales metálicos en muestras Biológicas; explorando interacciones entre Metales usando radiación de Sincrotrón	2020-2021	35,000.00
Programa Fellows Gipuzkoa 2020	Aitziber L. Cortajarena/ Ivan Coluzza	EINPySB - Estudio de la Interfase entre Nanomateriales Peptídicos y Sistemas Biológicos	2020-2021	39,492.00
Programa Fellows Gipuzkoa 2020	Luis M. Liz-Marzán (Oscar Ferreira Silvestre)	NanoMito4Imaging - Nanoterapias dirigidas a la mitocondria y herramientas de imagen de precisión avanzadas para la administración de medicamentos	2020-2021	39,492.00
Ayudas para la investigación contra enfermedades severas 2020	Niels C. Reichardt	Robot pipeteo - Proyecto de Adquisición de un Robot de Pipeteo para Plataforma Diagnóstica COVID-19	2020-2021	29,323.00
Acompañamiento en el proceso de creación de empresas de base tecnológica y/o innovadoras 2020	Aitziber L. Cortajarena	Serket BioMed – Proyecto de acompañamiento en el proceso de creación de una empresa de base tecnológica	2020-2021	50,000.00
Promoción del talento y el aprendizaje de las personas en las empresas 2020	CIC biomaGUNE	bmG-HRS4R – Proyecto de Implantación del Sello de Excelencia en Recursos Humanos de Investigación	2020-2021	10,794.11

CALL	PI	Full Title	Period	Amount (€)
Talento Innovador 2020	Ivan Coluzza	DesFIA - Búsqueda de dianas terapéuticas guiada por inteligencia artificial	2020-2021	20,000.00
Talento Innovador 2020	Alejandro Criado	FLU-gFET - Detección de flujo multivalente de virus SARSCoV-2	2020-2021	20,000.00

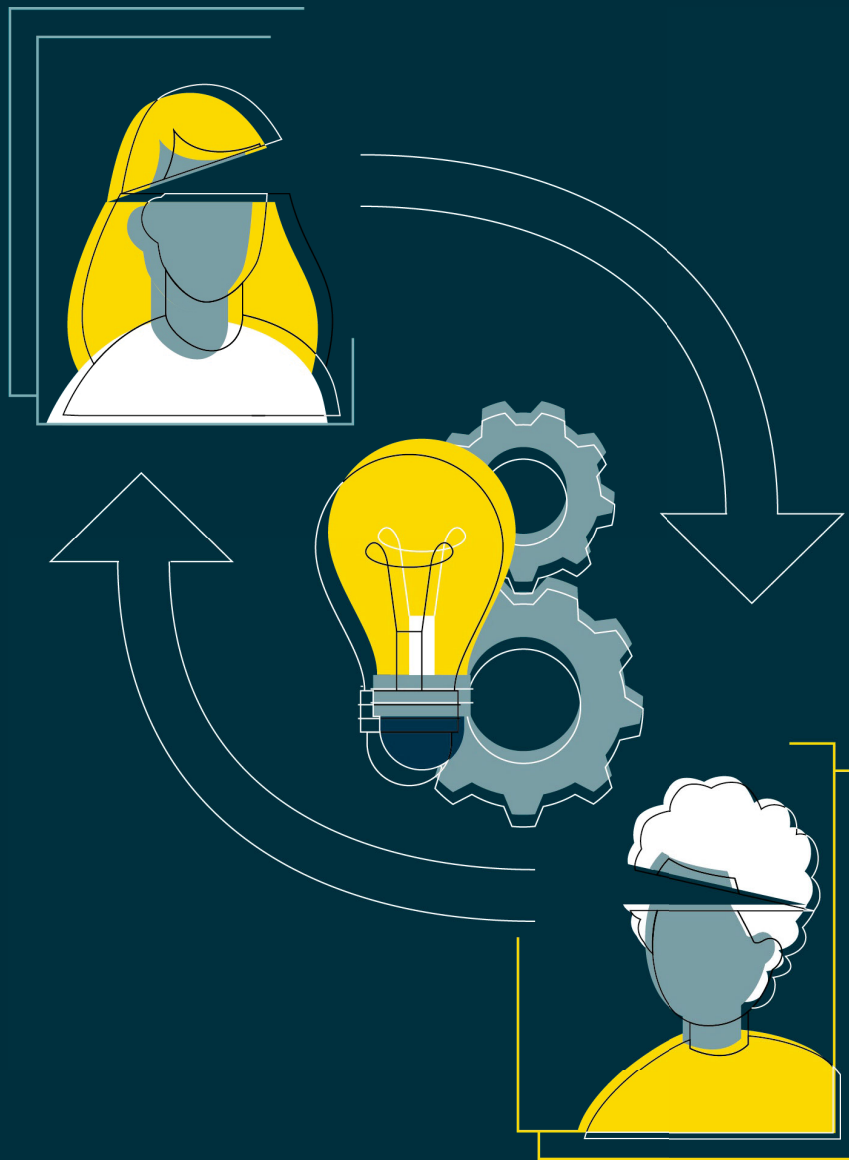
CALL	PI (Fellow)	Full Title	Period	Amount (€)
Health Research Call 2020	Jesús Ruiz-Cabello	ATHEROCONVERGENCE - Flow-driven inflammation and arterial wall remodeling in atherosclerosis: mechanisms and therapeutic potential	2020-2023	124,630.00
			2020-2023	115,092.00
Doctoral Fellowship INPhINIT Incoming 2020	Aitziber L. Cortajarena (Gabriela Guedes)	Protein-based functional materials		

CALL	PI	Full Title	Period	Amount (€)
Ayudas 2019 a proyectos de investigación en Cáncer de Pulmón	Luis M. Liz-Marzán	INDICATE - INvitro Diagnostics for Cancer TEsting: Desarrollo de un análisis de sangre económico, sensible y rápido para mejorar el diagnóstico y las decisiones de tratamiento en pacientes con cáncer de pulmón	2020-2023	7,920.00

Total Funding: 7,731,721€



Knowledge & Technology Transfer



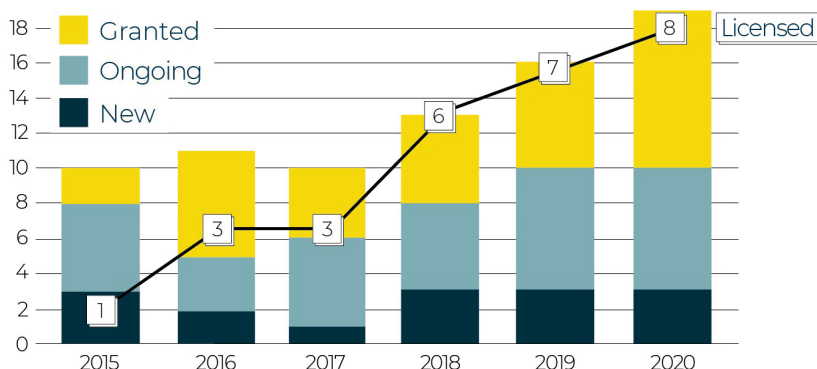
In 2020 **3** new **Priority Patent Applications** have been filed, **1 Patent** was **Granted** and **17 Collaboration Agreements** with industrial or clinical partners signed.

CIC biomaGUNE is making a substantial effort to promote the transfer to the market of research results produced at the center. In this respect, an initiative has been launched to identify and support the development of those technologies with a clear market potential, namely the development unit (DU) initiative, within the R&D&I management unit. The DU acts as an antenna and incubator of ideas, with the main objective of identifying and transferring research results from the center into the market, by protecting the results, encouraging their exploitation and

strengthening patent licensing. Projects to be matured within the DU are initially evaluated by the Scientific Direction of the center, on the basis of criteria that include the consistency of the initiative with the center's activity and the benefit that the initiative can obtain from the infrastructure/resources of the center for its maturation. In addition, the R&D&I management unit works on establishing new contracts with companies, promoting cross-sectorial research and maximizing the transfer of knowledge and technology.

Patents

The generation of patents is one of the instruments that indicate the transfer of knowledge from the Center to Society and to business development. The graph shows the evolution over the years.



2020 Patent Applications

Glycan mediated spleen targeting using extracellular vesicles

*N. C. Reichardt,
C. Williams, J. M. Falcón*

EP20382981.7
13.11.2020

Isoalloxazine-based catalytic systems and uses thereof.

*F. López-Gallego,
L. Salassa*

EP20383067.4
07.12.2020

Layered substrate and uses thereof.

*L. M. Liz-Marzán, J. Plou,
M. Charconnet, I. García*

EP20383131.8
21.12.2020

Pharmaceutical composition comprising fluorine-18 labelled gases

J. Llop Roig, V. Gómez-Vallejo, T. Reese, A. Lecuona.

EP17733822.5
US10849994B2

Spin-Off

Asparia Glycomics



www.aspariaglycomics.com

In 2016, CIC biomaGUNE researchers and private investors joined efforts to set up **Asparia Glycomics**, a spin-off company specialized in the production and marketing of reagents, reference standards, kits and software, intended for glycan analysis in clinical diagnosis and for quality control of biopharmaceuticals.

The business initiative markets the leading technology developed by CIC biomaGUNE's Glycotechnology Laboratory, directed by Niels Reichardt, to quantify and identify glycans more accurately and faster than existing solutions on the market. Asparia Glycomics offers unique, stable, isotope labeled glycans as internal standards, custom made quantification software and reagents for glycan analysis by mass spectrometry.

Asparia Glycomics' line of work is based on the development of its own technology that can be useful for the diagnosis and prognosis of cancer, diabetes or autoimmune diseases such as rheumatoid arthritis, among others.

The products and technology developed by the Glycotechnology Laboratory, reviewed and validated by the CIC biomaGUNE Development Unit are aimed at researchers, academia and pharmaceutical companies around the world.

During 2020 and after a change of management, the company has been able to break even and has established a position as a reliable provider of cutting-edge glycan analysis and synthesis projects for leading biotech companies and academic researchers worldwide.

The company has been certified as Innovative SME by the Spanish government.

The collaboration between Asparia Glycomics and CIC biomaGUNE has continued during 2020 with several ongoing research projects and 3 co-directed PhD Theses.

Research Agreements with Companies



CIC biomaGUNE develops joint research activities in collaboration with different types of organizations and companies, including spin-offs, SMEs, large companies and research organizations.

This research activity has a sharp focus on innovation, to which CIC biomaGUNE contributes with scientific knowledge. Joint projects under development include privately funded research activities as well as research contracts and consultancy services.

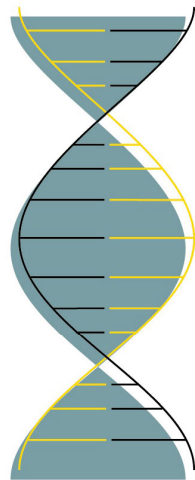
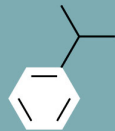
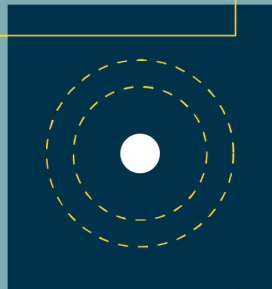
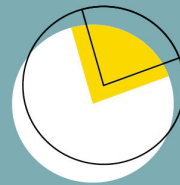
During 2020, besides several technical services provided to industry and the initiation of conversations with many companies, 17 collaboration agreements with 11 industrial or clinical partners were signed.

17
Collaboration
Agreements
with


11
Industrial
or Clinical
Partners

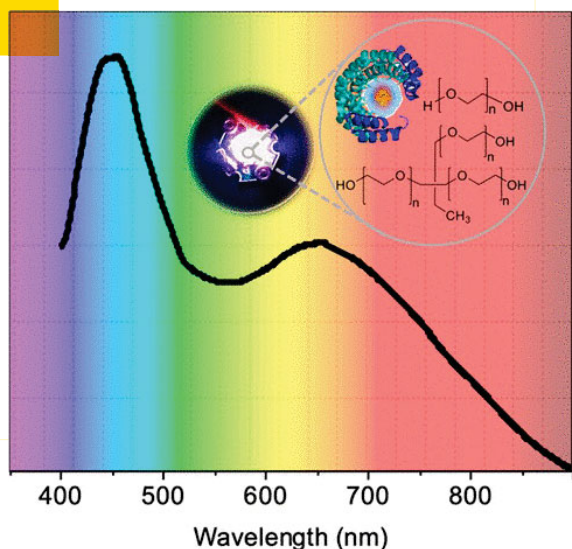
- Hospital Clínico Universitario de Valladolid
- Acuratio Europe S.L.
- AQUADAT Efficient Innovation, s.l.
- ASPARIA GLYCOMICS S.L
- IXTAL srl; Naturality Research & Development, S.L.
- Numio Tecnologías, S.L.
- Onena Medicines S.L.
- Out and Out Chemistry, Pr LLC
- Starget Pharma, Ltd.
- TiCom Sp. z o.o.

Scientific Output



In 2020, **188 research articles** have been published in international scientific journals with an **average impact factor of 8.5** and received **8736 citations**.

Journal	 Impact Factor	 N° of Articles
Chemical Society Reviews	42.85	1
Nature	42.78	1
Science	41.84	1
Nature Nanotechnology	31.54	1
Advanced Materials	27.40	2
Nature Immunology	20.48	1
Chem	19.73	1
Advanced Functional Materials	16.84	6
Advanced Science	15.84	1
Journal of the American Chemical Society	14.61	4
ACS Nano	14.59	8
Science Advances	13.12	2
Angewandte Chemie International Edition	12.96	5
ACS Catalysis	12.35	2
Materials Horizons	12.32	1
Nature Communications	12.12	2
Journal of Clinical Investigation	11.86	1
Small	11.46	3
Nano Letters	11.24	2
Biosensors and Bioelectronics	10.26	1

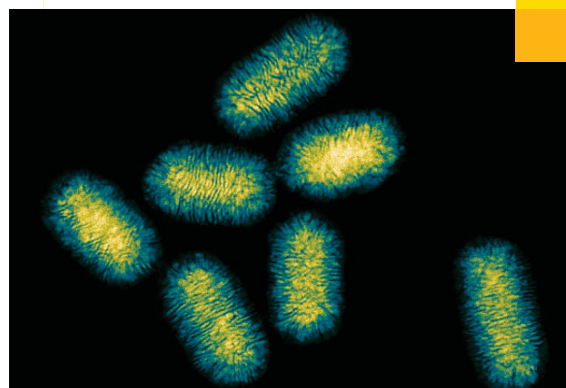


White-emitting Protein-Metal Nanocluster Phosphors for Highly Performing Biohybrid Light-Emitting Diodes

Aires, A; Fernández-Luna, V; Fernández-Cestau, J; Costa, RD; Cortajarena, AL.

Nano Letters 2020, 20, 2710–2716
DOI: 10.1021/acs.nanolett.0c00324

This work presents a simple in situ synthesis and stabilization of fluorescent gold nanoclusters (AuNCs) with different sizes using engineered protein scaffolds in water. The protein-AuNC hybrids show a dual emission (450 and 700 nm) with a record photoluminescence quantum yield of 20%. These features impelled us to apply them to biohybrid light-emitting diodes as color down-converting filters or biophosphors. Efficient white emission (x/y CIE color coordinates of 0.31/0.29) and stabilities of more than 800 h were achieved. This represents a 2 orders of magnitude enhancement compared to the prior art. Besides the outstanding performance, the protein scaffold also infers a unique anisotropic emission character that is considered as a proof-of-concept of high interest for single-point lighting and display.



Micelle-directed chiral seeded growth on anisotropic gold nanocrystals

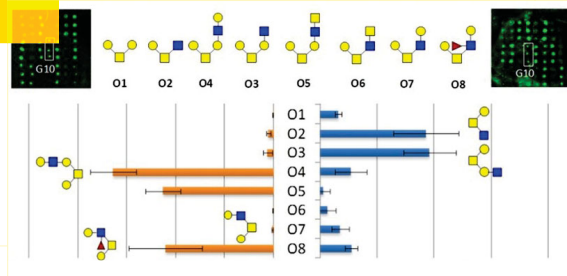
González-Rubio, G; Mosquera, J; Kumar, V; Pedraza-Tardajos, A; Llombart, P; Solís, DM; Lobato, I; Noya, EG; Guerrero-Martínez, A; Taboada, JM; Obelleiro, F; MacDowell, LG; Bals, S; Liz-Marzán, LM.

Science, 2020, 368, 1472-1477
DOI: 10.1126/science.aba0980

This work reports a mechanism by which gold atoms are deposited by means of chemical reduction onto previously formed gold nanorods to produce a quasi-helical structure (the particles acquire chirality). This geometry enables these “nanoscrews” to interact with circularly polarized light much more efficiently than what is achieved with any other known object. These properties could lead to the detecting of biomolecules in a very selective and very sensitive way.

Surfactant-assisted seeded growth of metal nanoparticles (NPs) can be engineered to produce anisotropic gold nanocrystals with high chiroptical activity through the templating effect of chiral micelles formed in the presence of dissymmetric cosurfactants. Mixed micelles adsorb on gold nanorods, forming quasi-helical patterns that direct seeded growth into NPs with pronounced morphological and optical handedness. Sharp chiral wrinkles lead to chiral plasmon modes with high dissymmetry factors (~ 0.20). Through variation of the dimensions of chiral wrinkles, the chiroptical properties can be tuned within the visible and near-infrared electromagnetic spectrum. The micelle-directed mechanism allows extension to other systems, such as the seeded growth of chiral platinum shells on gold nanorods. This approach provides a reproducible, simple, and scalable method toward the fabrication of NPs with high chiral optical activity.

□



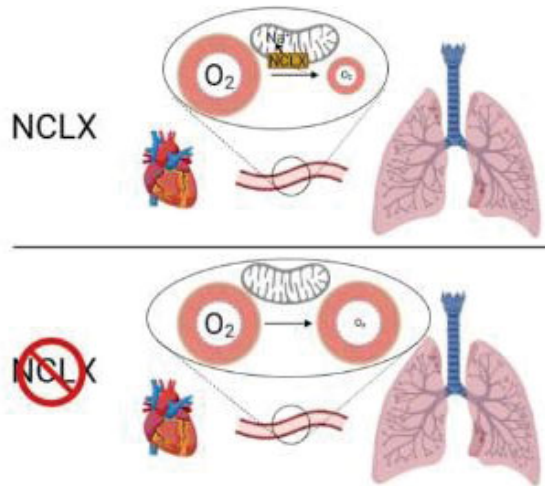
Chemo-Enzymatic Synthesis of *S. mansoni* O-Glycans and Their Evaluation as Ligands for C-Type Lectin Receptors MGL, DC-SIGN, and DC-SIGNR

Pham, J.; Hernández, A.; Cioce, A.; Achilli, S.; Goti, G.; Vivès, C.; Thepaut, M.; Bernardi, A.; Fieschi, F. and Reichardt, N.C.

Chem. Eur. J., 26, 12818-12830
DOI: 10.1002/chem.202000291

Due to their interactions with C-type lectin receptors (CLRs), glycans from the helminth *Schistosoma mansoni* represent promising leads for treatment of autoimmune diseases, allergies or cancer. We chemo-enzymatically synthesized nine O-glycans based on the two predominant O-glycan cores observed in the infectious stages of schistosomiasis, the mucin core 2 and the *S. mansoni* core. The O-glycans were fucosylated next to a selection of *N*-glycans directly on a microarray slide using a recombinant fucosyltransferase and GDP-fucose or GDP-6-azidofucose as donor. Binding assays with fluorescently labelled human CLRs DC-SIGN, DC-SIGNR and MGL revealed the novel O-glycan O8 as the best ligand for MGL from our panel. Significant binding to DC-SIGN was also found for azido-fucosylated glycans. Contrasting binding specificities were observed between the monovalent carbohydrate recognition domain (CRD) and the tetravalent extracellular domain (ECD) of DC-SIGNR.

NCLX



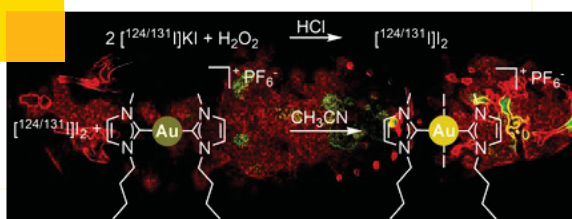
The figure illustrates the role of the mitochondrial calcium sodium exchanger (NCLX) in early adaptation to low oxygen calibration or hypoxia by introducing sodium into the mitochondria / CNIC

Na⁺ controls hypoxic signalling by the mitochondrial respiratory chain

Hernansanz-Agustín, P; Choya-Foces, C; Carregal-Romero, S; Ramos, E; Oliva, T; Villa-Piña, T; Moreno, L; Izquierdo-Álvarez, A; Cabrera-García, JD; Cortés, A; Lechuga-Vieco, AV; Jadiya, P; Navarro, E; Parada, E; Palomino-Antolín, A; Tello, D; Acín-Pérez, R; Rodríguez-Aguilera, JC; Navas, P; Cogolludo, Á; López-Montero, I; Martínez-del-Pozo, Á; Egea, J; López, MG; Elrod, JW; Ruiz-Cabello, J; Bogdanova, A; Enríquez, JA; Martínez-Ruiz, A.

Nature 2020, 586, 287–291
DOI: 10.1038/s41586-020-2551-y

A multidisciplinary study published in *Nature* in which the Laboratory of Molecular and Functional Biomarkers of CIC biomaGUNE has participated, led by Ikerbasque Professor Jesús Ruiz-Cabello—specialist in the study of pulmonary vascular diseases—, have made a major advance toward deciphering the mechanism through which the production of reactive oxygen species (ROS) increases in the early phases of hypoxia (acute reduction in tissue oxygen). The finding represents an important advance in the understanding of cell physiology and could be exploited in the future to treat a variety of diseases in which hypoxia plays a role, such as stroke and heart attack.

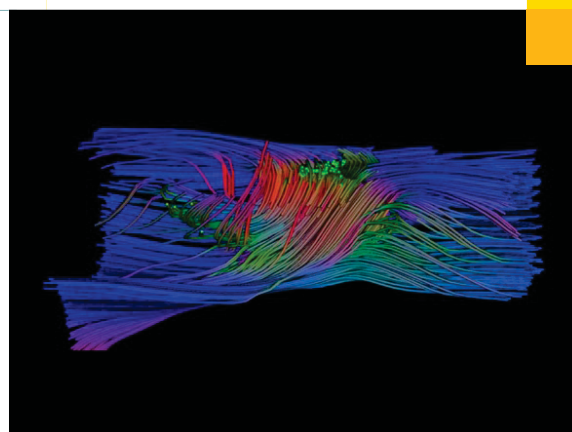


I-124 Radiolabeling of a Au-III-NHC Complex for *In Vivo* Biodistribution Studies

Guarra, F; Terenzi, A; Pirker, C; Passannante, R; Baier, D; Zangrando, E; Gómez-Vallejo, V; Biver, T; Gabbiani, C; Berger, W; Llop, J; Salassa, L.

Angew. Chem. Int. Ed., 2020, 59, 17130-17136
DOI: 10.1002/anie.202008046

Au^{III} complexes with N-heterocyclic carbene (NHC) ligands have shown remarkable potential as anticancer agents, yet their fate *in vivo* has not been thoroughly examined and understood. Reported herein is the synthesis of new Au^{III}-NHC complexes by direct oxidation with radioactive [¹²⁴I]₂ as a valuable strategy to monitor the *in vivo* biodistribution of this class of compounds using positron emission tomography (PET). While *in vitro* analyses provide direct evidence for the importance of Au^{III}-to-Au^I reduction to achieve full anticancer activity, *in vivo* studies reveal that a fraction of the Au^{III}-NHC prodrug is not immediately reduced after administration but able to reach the major organs before metabolic activation.

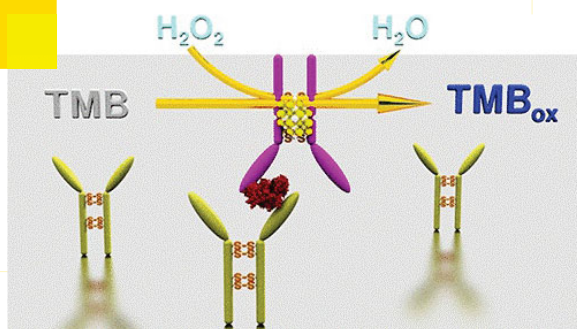


Functional rewiring across spinal injuries via biomimetic nanofiber scaffolds

Usmani S; Franceschi Biagioni A; Medelin M; Scaini D; Casani R; Aurand E; Padro D; Egimendia A; Ramos-Cabrer P; Scarselli M, De Crescenzi M, Prato M; Ballerini L.

PNAS 2020 117, 25212-25218
DOI: 10.1073/pnas.2005708117

The re-growth of severed axons is fundamental to reestablish motor control after spinal-cord injury (SCI). Ongoing efforts to promote axonal regeneration after SCI have involved multiple strategies only partially successful. Our study introduces an artificial carbon-nanotube based scaffold that, once implanted in SCI rats, improves motor function recovery. Confocal microscopy analysis plus fiber tracking by magnetic resonance imaging and neurotracer labelling of long-distance cortico-spinal axons, suggest that recovery might be partly attributable to successful crossing of the lesion site by regenerating fibers. Since manipulating SCI microenvironment properties, such as mechanical and electrical ones, may promote biological responses, we propose this artificial scaffold as a prototype to exploit the physics governing spinal regenerative plasticity.

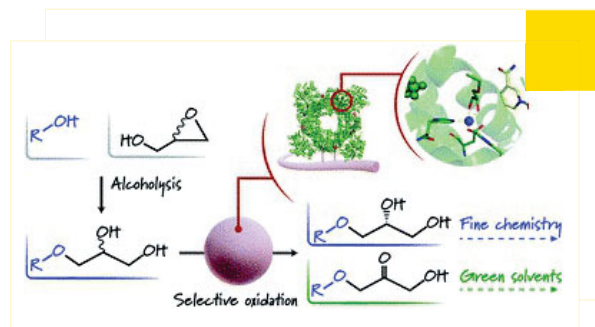


Synthesis and Characterization of Antibody-Protected Bimetallic Nanoclusters with Catalytic Properties

Mora-Sanz, V; Saa, L; Briz, N; Pavlov, V.

Chem. Mater. 2020, 32, 8286–8293,
DOI: 10.1021/acs.chemmater.0c02096

In this work, a novel and facile method for the synthesis of gold-platinum bimetallic nanoclusters (NCs) embedded in the structure of an IgG (Au/Pt NCs-IgG) is presented. Proteins have been widely used as scaffolds for the synthesis of atomic clusters. The harsh conditions usually required during the synthesis imply the denaturation of different proteins and the loss of their biological activity. We propose a strategy for the synthesis of NCs employing IgG as a scaffold, performed under physiological conditions in order to keep the IgG structure unaltered, allowing the resulting material to bind to Protein G and the antigen. NCs composed of two different types of atoms exhibit higher catalytic activity than monometallic NCs due to the synergistic effect of two diverse atoms. This peroxidase-like activity and the maintained affinity for its antigen make Au/Pt NCs-IgG a suitable material for its use as a detection antibody in a direct sandwich enzyme-linked immunosorbent assay (ELISA). The use of Au/Pt NCs-IgG as an alternative to IgG tethered to horseradish peroxidase in ELISA boosts the limit of detection (LOD) by 56 times.



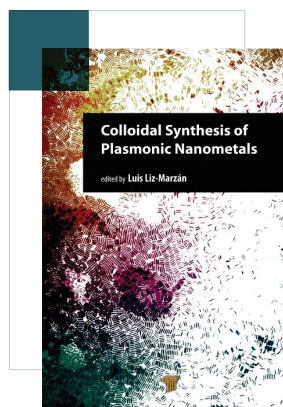
Selective oxidation of alkyl and aryl glyceryl monoethers catalysed by an engineered and immobilised glycerol dehydrogenase chain

Velasco-Lozano, S; Roca, M; Leal, A; Mayoral, JA; Pires, E; Moliner, V; López-Gallego, F.

Chem. Sci., 2020, 11, 12009-12020
DOI: 10.1039/D0SC04471G

Enzymes acting over glyceryl ethers are scarce in living cells, and consequently biocatalytic transformations of these molecules are rare despite their interest for industrial chemistry. In this work, we have engineered and immobilised a glycerol dehydrogenase from *Bacillus stearothermophilus* (BsGlyDH) to accept a battery of alkyl/aryl glyceryl monoethers and catalyse their enantioselective oxidation to yield the corresponding 3-alkoxy/aryloxy-1-hydroxyacetones. QM/MM computational studies decipher the key role of D123 in the oxidation catalytic mechanism, and reveal that this enzyme is highly enantioselective towards S-isomers (ee > 99%). Through structure-guided site-selective mutagenesis, we find that the mutation L252A sculpts the active site to accommodate a productive configuration of 3-monoalkyl glycerols. This mutation enhances the k_{cat} 163-fold towards 3-ethoxypropan-1,2-diol, resulting in a specific activity similar to the one found for the wild-type towards glycerol. Furthermore, we immobilised the L252A variant to intensify the process, demonstrating the reusability and increasing the operational stability of the resulting heterogeneous biocatalyst. Finally, we manage to integrate this immobilised enzyme into a one-pot chemoenzymatic process to convert glycidol and ethanol into 3-ethoxy-1-hydroxyacetone and (R)-3-ethoxypropan-1,2-diol, without affecting the oxidation activity. These results thus expand the uses of engineered glycerol dehydrogenases in applied biocatalysis for the kinetic resolution of glycerol ethers and the manufacturing of substituted hydroxyacetones.

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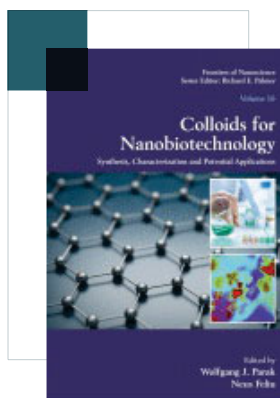


Colloidal Synthesis of Plasmonic Nanometals

Liz-Marzán, L.M.

2020, *Jenny Stanford Publishing*;
1st edition

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Colloids for Nanobiotechnology: Synthesis, Characterization and Potential Applications

Feliu, N.; Parak, W. J.

Frontiers of Nanoscience, Vol 16,
2020, Elsevier.

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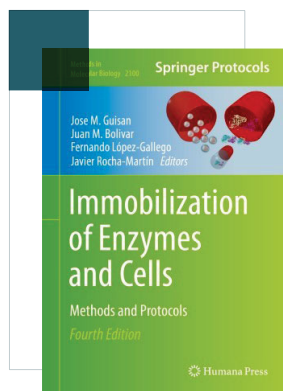
Trends in Quorum Sensing and Quorum Quenching: New Perspectives and Applications;

"Analysis of Quorum Sensing by Surface-Enhanced Raman Scattering Spectroscopy"

Bodelón, G.; De Marchi-Lourenco, S.;
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Liz-Marzán, L.M.

CRC Press, Ch. 5, 2020, pp. 59-77

ISBN: 9780367224288

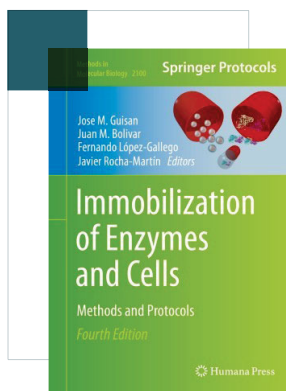


Immobilization of Enzymes and Cells

Guisan, JM.; Bolivar, JM; López-Gallego, F; Rocha-Martín, J.

Springer, 2020, Vol. 2100

ISBN: 978-1-0716-0215-7



Encapsulation of Enzymes in Protein Films

Sánchez-de-Alcázar, Liutkus M.;
Cortajarena, A. L.

Immobilization of Enzymes and Cells, Springer, 2020, Vol. 2100, pp. 211-226

Encapsulation of Enzymes in Porous Capsules via Particle Templating

Zyzin, MV; Ramos-Cabrer, P;
Carregal-Romero, S.

Immobilization of Enzymes and Cells, Springer, 2020, Vol. 2100, pp. 227-241

ISBN: 978-1-0716-0215-7



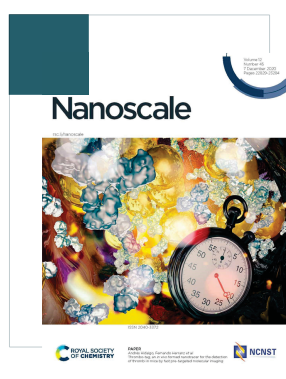
MRI to CTA Translation for Pulmonary Artery Evaluation Using CycleGANs Trained with Unpaired Data

Stephens, M.; San José Estépar, R.;
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Macía, I.; López-Linares, K.

Thoracic Image Analysis; Springer, 2020; pp 118–129. Part of the *Lecture Notes in Computer Science* book series (LNCS, volume 12502)
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Thrombo-tag, an *in vivo* formed nanotracer for the detection of thrombi in mice by fast pre-targeted molecular imaging

Adrover, JM; Pellico, J; Fernández-Barahona, I; Martín-Salamanca, S; Ruiz-Cabello, J; Hidalgo, A; Herranz, F.

Nanoscale 2020, 12, 2297



Selective oxidation of alkyl and aryl glyceryl monoethers catalysed by an engineered and immobilised glycerol dehydrogenase

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Chem. Sci. 2020, 11, 12009



Discovering Biomolecules with Huisgenase Activity: Designed Repeat Proteins as Biocatalysts for (3+2) Cycloadditions

Rivilla, I; Odriozola-Gimeno, M; Aires, A; Gimeno, A; Jiménez-Barbero, J; Torrent-Sucarrat, M; Cortajarena, AL; Cossío, FP.

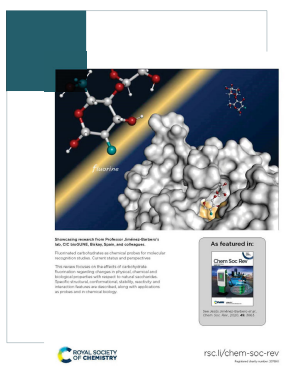
J. Am. Chem. Soc. 2020, 142, 762-776



Biogenic fluorescent protein-silk fibroin phosphors for high performing light-emitting diodes

Fernandez-Luna, V; Fernandez-Blazquez, JP; Monclus, MA; Rajo, FJ; Daza, R; Sánchez-de-Alcázar, D; Cortajarena, AL; Costa, RD

Mater. Horiz. 2020, 7, 1790-1800



Fluorinated carbohydrates as chemical probes for molecular recognition studies. Current status and perspectives

Linclau, B; Arda, A; Reichardt, NC; Sollogoub, M; Unione, L; Vincent, SP; Jiménez-Barbero, J.

Chem. Soc. Rev. 2020, 49, 3863-3888



Templated-Assembly of CsPbBr₃ Perovskite Nanocrystals into 2D Photonic Supercrystals with Amplified Spontaneous Emission

Polavarapu, L; Vila-Liarte, D; Feil, MW; Manzi, A; García-Pomar, JL; Huang, H; Döblinger, M; Liz-Marzán, LM; Feldmann, J; Mihi, A

Angew. Chem. Int. Ed. 2020, 59, 17750-17756



Dual Monitoring of Surface Reactions in Real Time by Combined Surface-Plasmon Resonance and Field-Effect Transistor Interrogation

Aspermaier, P; Ramach, U; Reiner-Rozman, C; Fossati, S; Lechner, B; Moya, S; Azzaroni, O; Dostalek, J; Szunerits, S; Knoll, W; Bintinger, J.

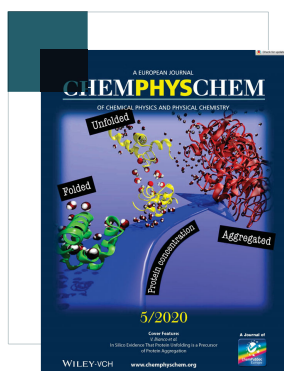
J. Am. Chem. Soc. 2020, 142, 11709-1171



Colloidal Superstructures with Triangular Cores: Size Effects on SERS Efficiency

Höller, RPM; Kuttner, C; Mayer, M; Wang, R; Dulle, M; Contreras-Cáceres, R; Fery, A; Liz-Marzán, LM.

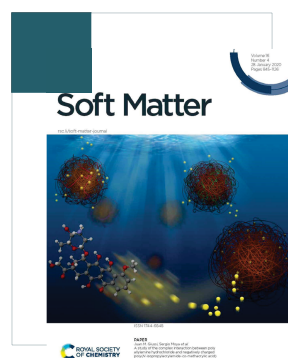
ACS Photonics 2020, 7, 1839-1848



In Silico Evidence That Protein Unfolding is a Precursor of Protein Aggregation

Bianco, V; Franzese, G; Coluzza, I.

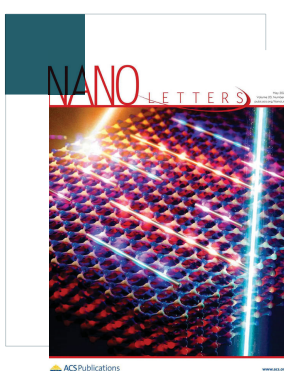
ChemPhysChem 2020, 21, 377-384



A study of the complex interaction between poly allylamine hydrochloride and negatively charged poly(N-isopropylacrylamide-co-methacrylic acid) microgels

Giussi, JM; Martínez-Moro, M; Iborra, A; Cortez, ML; Di Silvio, D; Larena, I; Longo, GS; Azzaroni, O; Moya, S.

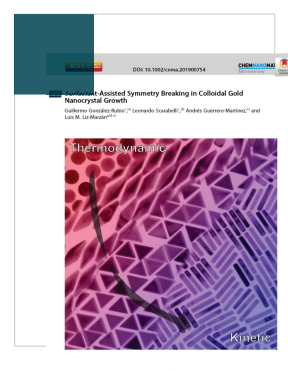
Soft Matter 2020, 16, 881-890



Tailored Nanoscale Plasmon-Enhanced Vibrational Electron Spectroscopy

Tizei, LH; Mkhitarian, V; Lourenço-Martins, H; Scarabelli, L; Watanabe, K; Taniguchi, T; Tencé, M; Blazit, J; Li, X; Gloter, A; Zobelli, A; Schmidt, F; Liz-Marzán, LM; García de Abajo, FJ; Stephan, O; Kociak, M.

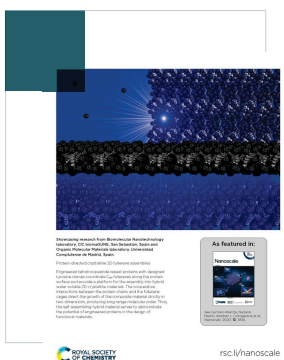
Nano Lett. 2020, 20, 2973-2979



Surfactant-Assisted Symmetry Breaking in Colloidal Gold Nanocrystal Growth

González-Rubio, G; Scarabelli, L; Guerrero-Martínez, A; Liz-Marzán, LM

ChemNanoMat 2020, 6, 698-707



Protein-directed crystalline 2D fullerene assemblies

Liutkus, M; López-Andarias, A; Mejías, SH; López-Andarias, J; Gil-Carton, D; Feixas, F; Osuna, S; Matsuda, W; Sakurai, T; Seki, S; Aienza, C; Martín, N; Cortajarena, AL.

Nanoscale 2020, 12, 3614-3622



Water Soluble Cationic Poly(3,4-Ethylenedioxythiophene) PEDOT-N as a Versatile Conducting Polymer for Bioelectronics

Minudri, D; Mantione, D; Domínguez-Alfaro, A; Moya, S; Maza, E; Bellacanzone, C; Antognazza, MR; Mecerreyes, D.

Adv. Electron. Mater. 2020, 6-10, 2000510



Growth of ZIF-8 MOF Films with Tunable Porosity by using Poly (1-vinylimidazole) Brushes as 3D Primers

Allegretto, JA; Iborra, A; Giussi, JM; von Biderling, C; Ceolin, M; Moya, S; Azzaroni, O; Rafti, M.

Chem. Eur. J. 2020, 26, 12388-12396

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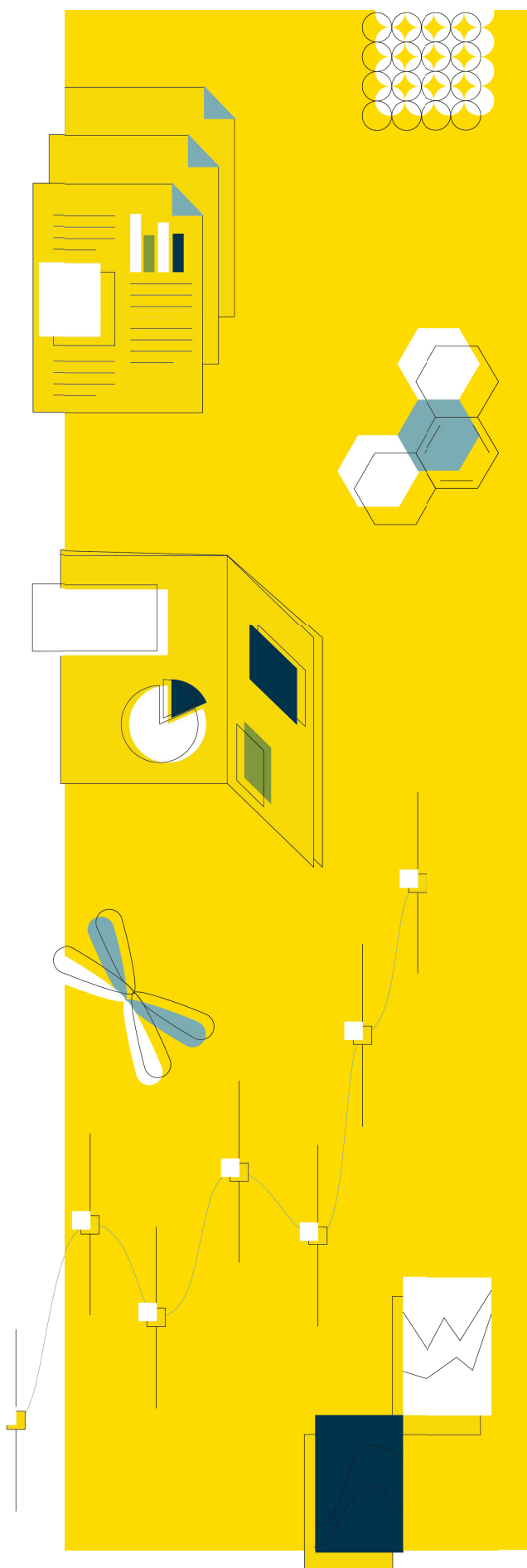
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Kang, NX; Wang, Q; Ojeda, R; Wang, WJ; Fu, FY; Moro, MM; Ramirez, MD; Moya, S; Coy, E; Salmon, L; Pozzo, JL; Astruc, D. **Visible-Light Acceleration of H₂ Evolution from Aqueous Solutions of Inorganic Hydrides Catalyzed by Gold-Transition-Metal Nanoalloys.** *ACS Appl. Mater. Interfaces* 2020, 12, 53816-53826

Holler, RPM; Jahn, IJ; Cialla-May, D; Chanana, M; Popp, J; Fery, A; Kuttner, C. **Biomacromolecular-Assembled Nanoclusters: Key Aspects for Robust Colloidal SERS Sensing.** *ACS Appl. Mater. Interfaces* 2020, 12, 57302-57313

Dominguez-Alfaro, A; Alegret, N; Arnaiz, B; Salsamendi, M; Mecerreyes, D; Prato, M. **Toward Spontaneous Neuronal Differentiation of SH-SY5Y Cells Using Novel Three-Dimensional Electropolymerized Conductive Scaffolds.** *ACS Appl. Mater. Interfaces* 2020, 12, 57330-57342

Izquierdo-Garcia, JL; Comella-del-Barrio, P; Campos-Olivas, R; Villar-Hernández, R; Prat-Aymerich, C; De Souza-Galvão, ML; Jiménez-Fuentes, MA; Ruiz-Manzano, J; Stojanovic, Z; González, A; Serra-Vidal, M; García-García, E; Muriel-Moreno, B; Millet, JP; Molina-Pinargote, I; Casas, X; Santiago, J; Sabriá, F; Martos, C; Herzmann, C; Ruiz-Cabello, J; Domínguez, J. **Discovery and validation of an NMR-based metabolomic profile in urine as TB biomarker.** *Sci. Rep.* 2020, 10, 22317

Cavion, F; Fusco, L; Sosa, S; Manfrin, C; Alonso, B; Zurutuza, A; Della Loggia, R; Tubaro, A; Prato, M; Pelin, M. **Ecotoxicological impact of graphene oxide: toxic effects on the model organism *Artemia franciscana*.** *Environ. Sci. Nano.* 2020, 7, 3605-3615

Hui, CK; Tomilov, A; Garcia, C; Jiang, XS; Fash, DM; Khmour, OM; Rosso, C; Filippini, G; Prato, M; Graham, J; Hecht, S; Havel, P; Cortopassi, G. **Novel idebenone analogs block Shc's access to insulin receptor to improve insulin sensitivity.** *Biomed. Pharmacother.* 2020, 132, 110823

Benítez-Mateos, AI; Huber, C; Nidetzky, B; Bolivar, JM; López-Gallego, F. **Design of the Enzyme-Carrier Interface to Overcome the O₂ and NADH Mass Transfer Limitations of an Immobilized Flavin Oxidase.** *ACS Appl. Mater. Interfaces* 2020, 12, 56027-56038

Cotrina, EY; Gimeno, A; Llop, J; Jimenez-Barbero, J; Quintana, J; Prohens, R; Cardoso, I; Arsequell, G. **An Assay for Screening Potential Drug Candidates for Alzheimer's Disease That Act as Chaperones of the Transthyretin and Amyloid-beta Peptides Interaction.** *Chem. Eur. J.* 2020, 26, 17462-17469

van der Weide, H; Cossio, U; Gracia, R; Te Welscher, YM; Ten Kate, MT; van der Meijden, A; Marradi, M; Ritsema, JAS; Vermeulen-de Jongh, DMC; Storm, G; Goessens, WHF; Loinaz, I; van Nostrum, CF; Llop, J; Hays, JP; Bakker-Woudenberg, IAJM. **Therapeutic Efficacy of Novel Antimicrobial Peptide AA139-Nanomedicines in a Multidrug-Resistant *Klebsiella pneumoniae* Pneumonia-Septicemia Model in Rats.** *Antimicrob. Agents Chemoter.* 2020, 64, e00517-20

Hou, H; Cardo, L; Mancino, D; Arnaiz, B; Criado, A; Prato, M. **Electrochemically controlled cleavage of imine bonds on a graphene platform: towards new electro-responsive hybrids for drug release.** *Nanoscale* 2020, 12, 23824

de Lima, LI; Faria, RS; Franco, MS; Roque, MC; Pacheco, TJA; Rodrigues, MC; Muehlmann, LA; Moya, S; Azevedo, RB; Oliveira, MC; Longo, JPF. **Combined paclitaxel-doxorubicin liposomal results in positive prognosis with infiltrating lymphocytes in lung metastasis.** *Nanomedicine* 2020, 15, 2753-2770

Portioli, C; Bussy, C; Mazza, M; Lozano, N; Jasim, DA; Prato, M; Bianco, A; Bentivoglio, M; Kostarelos, K. **Intracerebral Injection of Graphene Oxide Nanosheets Mitigates Microglial Activation Without Inducing Acute Neurotoxicity: A Pilot Comparison to Other Nanomaterials.** *Small* 2020, 16, 2004029

Severoni, E; Maniappan, S; Liz-Marzán, LM; Kumar, J; García de Abajo, JF; Galantini, L. **Plasmon-Enhanced Optical Chirality through Hotspot Formation in Surfactant-Directed Self-Assembly of Gold Nanorods.** *ACS Nano* 2020, 14, 16712-16722

Alvarez-Dominguez, C; Salcines-Cuevas, D; Teran-Navarro, H; Calderon-Gonzalez, R; Tobes, R; Garcia, I; Grijalvo, S; Paradela, A; Seoane, A; Sangari, FJ; Fresno, M; Calvo-Montes, J; Bernal, ICPD; Yanez-Diaz, S. **Epitopes for Multivalent Vaccines Against *Listeria*, *Mycobacterium* and *Streptococcus* spp: A Novel Role for Glyceraldehyde-3-Phosphate Dehydrogenase.** *Front. Cell. Infect. Microbiol.* 2020, 10, 573348

Cotrina, EY; Oliveira, A; Leite, JP; Llop, J; Gales, L; Quintana, J; Cardoso, I; Arsequell, G. **Repurposing Benzbromarone for Familial Amyloid Polyneuropathy: A New Transthyretin Tetramer Stabilizer.** *Int. J. Mol. Sci.* 2020, 21, 7166

Jebari-Benslaiman, S; Uribe, KB; Benito-Vicente, A; Galicia-Garcia, U; Larrea-Sebal, A; Alloza, I; Vandenbroeck, K; Ostolaza, H; Martin, C. **Cholesterol Efflux Efficiency of Reconstituted HDL Is Affected by Nanoparticle Lipid Composition.** *Biomedicines* 2020, 8, 373

Benítez-Mateos, AI; Zeballos, N; Comino, N; Moreno de Redrojo, L; Randelovic, T; López-Gallego, F. **Microcompartmentalized Cell-Free Protein Synthesis in Hydrogel μ -Channels.** *ACS Synth. Biol.* 2020, 9, 2971-2978

Sadegh, F; Politakos, N; de San Roman, EG; Sanz, O; Perez-Miqueo, I; Moya, S; Tomovska, R. **A green synthesis of nanocatalysts based on reduced graphene oxide/magnetic nanoparticles for the degradation of Acid Red 1.** *RSC Adv.* 2020, 10, 38805-38817

Filippini, G; Longobardo, F; Forster, L; Criado, A; Di Carmine, G; Nasi, L; D'Agostino, C; Melchionna, M; Fornasiero, P; Prato, M. **Light-driven, heterogeneous organocatalysts for C-C bond formation toward valuable perfluoroalkylated intermediates.** *Sci. Adv.* 2020, 6, eabc9923

Stephens, M; Estepar, RSJ; Ruiz-Cabello, J; Arganda-Carreras, I; Macía, I; López-Linares, K. **MRI to CTA Translation for Pulmonary Artery Evaluation Using CycleGANs Trained with Unpaired Data.** *TIA* 2020, 12502, 118-129

Garrido, M; Gualandì, L; Di Noja, S; Filippini, G; Bosi, S; Prato, M. **Synthesis and applications of amino-functionalized carbon nanomaterials.** *Chem. Commun.* 2020, 56, 12698-12716

Zanelli, D; Carniel, FC; Garrido, M; Fortuna, L; Nepi, M; Cai, GM; Del Casino, C; Vazquez, E; Prato, M; Tretiach, M. **Effects of Few-Layer Graphene on the Sexual Reproduction of Seed Plants: An *In Vivo* Study with *Cucurbita pepo* L.** *Nanomaterials* 2020, 10, 1877

Ferrara, M; Bevilacqua, M; Melchionna, M; Criado, A; Crosera, M; Tavagnacco, C; Vizza, F; Fornasiero, P. **Exploration of cobalt@N-doped carbon nanocomposites toward hydrogen peroxide (H_2O_2) electro-synthesis: A two level investigation through the RRDE analysis and a polymer-based electrolyzer implementation.** *Electrochim. Acta* 2020, 364, 137287

Zhang, Y; Jimenez de Aberasturi, D; Henriksen-Lacey, M; Langer, J; Liz-Marzán, LM. **Live-Cell Surface-Enhanced Raman Spectroscopy Imaging of Intracellular pH: From Two Dimensions to Three Dimensions.** *ACS Sensors* 2020, 5, 3194-3206

Gallud, A; Delaval, M; Kinaret, P; Marwah, VS; Fortino, V; Ytterberg, J; Zubarev, R; Skoog, T; Kere, J; Correia, M; Loeschner, K; Al-Ahmady, Z; Kostarelos, K; Ruiz, J; Astruc, D; Monopoli, M; Handy, R; Moya, S; Savolainen, K; Alenius, H; Greco, D; Fadeel, B. **Multiparametric Profiling of Engineered Nanomaterials: Unmasking the Surface Coating Effect.** *Adv. Sci.* 2020, 7, 2002221

□
Yate, L; Martinez-de-Olcoz, L; Ivashchenko, VI; Pshyk, AV; Coy, E; Esteve, J; Lousa, A. **Stabilization of complex orthorhombic o-Cr₃C₂ thin films under high energetic growth conditions: Experiments and calculations.** *J. Alloys Compd.* 2020, 848, 156373

Adrover, JM; Pellico, J; Fernández-Barahona, I; Martín-Salamanca, S; Ruiz-Cabello, J; Hidalgo, A; Herranz, F. **Thrombo-tag, an *in vivo* formed nanotracer for the detection of thrombi in mice by fast pre-targeted molecular imaging.** *Nanoscale* 2020, 12, 22978

Wang, W; Chen, S; Guisasola-Cal, E; Martínez-Moro, M; Moya, S; Coy, E; Wang, C; Hamon, J; Astruc, D. **ZIF-8-based vs. ZIF-8-derived Au and Pd nanoparticles as efficient catalysts for the Ullmann homocoupling reaction.** *Inorg. Chem. Front.* 2020, 7, 3945-3952

Velasco-Lozano, S; Roca, M; Leal, A; Mayoral, JA; Pires, E; Moliner, V; López-Gallego, F. **Selective oxidation of alkyl and aryl glyceryl monoethers catalysed by an engineered and immobilised glycerol dehydrogenase.** *Chem. Sci.* 2020, 11, 12009

Mora-Sanz, V; Saa, L; Briz, N; Pavlov, V. **Synthesis and Characterization of Antibody-Protected Bimetallic Nanoclusters with Catalytic Properties.** *Chem. Mater.* 2020, 32, 8286-8293

Grajales-Hernández, D; Armendáriz-Ruiz, M; Velasco-Lozano, S; López-Gallego, F; Mateos-Díaz, JC. **Chitosan-based CLEAs from *Aspergillus niger* type A feruloyl esterase: high-productivity biocatalyst for alkyl ferulate synthesis.** *Appl. Microbiol. Biotechnol.* 2020, 104, 10033-10045

Sucre, A; Pazos, R; Reichardt, NC; Garin-Muga, A. **SugarArray: A User-centred-designed Platform for the Analysis of Lectin and Glycan Microarrays.** *Proceedings of the 13th International Joint Conference on Biomedical Engineering Systems and Technologies* 2020, 5, 106-116

Van Rie, J; González-Rubio, G; Kumar, S; Schütz, C; Kohlbrecher, J; Vanroelen, M; Van Gerven, T; Deschaume, O; Bartic, C; Liz-Marzán, LM; Salazar-Alvarez, G; Thielemans, W. **SANS study of mixed cholesteric cellulose nanocrystal - gold nanorod suspensions.** *Chem. Commun.* 2020, 56, 13001-13004

Usmani, S; Franceschi-Biagioni, A; Medelin, M; Scaini, D; Casani, R; Aurand, ER; Padro, D; Egimendia, A; Ramos-Cabrer, P; Scarselli, M; De Crescenzi, M; Prato, M; Ballerini, L. **Functional rewiring across spinal injuries via biomimetic nanofiber scaffolds.** *Proc. Natl. Acad. Sci. U. S. A.* 2020, 117, 25212-25218

Galicia-Garcia, U; Benito-Vicente, A; Jebari, S; Larrea-Sebal, A; Siddiqi, H; Uribe, KB; Ostolaza, H; Martin, C. **Pathophysiology of Type 2 Diabetes Mellitus.** *Int. J. Mol. Sci.* 2020, 21, 6275

Grzelak, D; Szustakiewicz, P; Tollan, C; Raj, S; Král, P; Lewandowski, W; Liz-Marzán, LM. ***In Situ* Tracking of Colloidally Stable and Ordered Assemblies of Gold Nanorods.** *J. Am. Chem. Soc.* 2020, 142, 18814-18825

Dordevic, L; Haines, P; Cacioppo, M; Arcudi, F; Scharl, T; Cadranel, A; Guldí, DM; Prato, M. **Synthesis and excited state processes of arrays containing amine-rich carbon dots and unsymmetrical rylene diimides.** *Mater. Chem. Front.* 2020, 4, 3640

Feiner, IVJ; Pulagam, KR; Gómez-Vallejo, V; Zamacola, K; Baz, Z; Caffarel, MM; Lawrie, CH; Ruiz-de-Angulo, A; Carril, M; Llop, J. **Therapeutic Pretargeting with Gold Nanoparticles as Drug Candidates for Boron Neutron Capture Therapy.** *Part. Part. Syst. Character.* 2020, 37, 2000200

Ruiz-de-Angulo, A; Bilbao-Asensio, M; Cronin, J; Evans, SJ; Clift, MJ; Llop, J; Feiner, IV; Beadman, R; Bascarán, KZ; Mareque-Rivas, JC. **Chemically Programmed Vaccines: Iron Catalysis in Nanoparticles Enhances Combination Immunotherapy and Immunotherapy-Promoted Tumor Ferroptosis.** *iScience* 2020, 23, 101499

San Sebastian, E; Cepeda, J; Huizi-Rayo, U; Terenzi, A; Finkelstein-Shapiro, D; padro, D; Santos, JI; Matxain, JM; Ugalde, JM; Mujica, V. **Enantiospecific Response in Cross-Polarization Solid-State Nuclear Magnetic Resonance of Optically Active Metal Organic Frameworks.** *J. Am. Chem. Soc.* 2020, 142, 17989-17996

Martinez, JD; Infantino, AS; Valverde, P; Diercks, T; Delgado, S; Reichardt, NC; Arda, A; Canada, FJ; Oscarson, S; Jimenez-Barbero, J. **The Interaction of Fluorinated Glycomimetics with DC-SIGN: Multiple Binding Modes Disentangled by the Combination of NMR Methods and MD Simulations.** *Pharmaceuticals* 2020, 13, 179

Pelin, M; Lin, HZ; Gazzì, A; Sosa, S; Ponti, C; Ortega, A; Zurutuza, A; Vazquez, E; Prato, M; Tubaro, A.; Bianco, A. **Partial Reversibility of the Cytotoxic Effect Induced by Graphene-Based Materials in Skin Keratinocytes.** *Nanomaterials* 2020, 10, 1602

Zalduendo, MM.; Oestreicher, V.; Langer, J.; Marzán, LM; Angelomé, PC. **Monitoring Chemical Reactions with SERS-Active Ag-Loaded Mesoporous TiO₂ Films.** *Anal. Chem.* 2020, 92, 13656-13660

Pham, J.; Hernandez, A.; Cioce, A.; Achilli, S.; Goti, G.; Vivès, C.; Thepaut, M.; Bernardi, A.; Fieschi, F. and Reichardt, NC. Chemo-Enzymatic Synthesis of *S. mansoni* O-Glycans and Their Evaluation as Ligands for C-Type Lectin Receptors MGL, DC-SIGN, and DC-SIGNR. *Chem. Eur. J.* 2020, 26, 12818-12830

Pineux, F.; Federico, S.; Klotz, KN; Kachler, S; Michiels, C; Sturlese, M; Prato, M; Spalluto, G; Moro, S; Bonifazi, D. Targeting G Protein-Coupled Receptors with Magnetic Carbon Nanotubes: The Case of the A₃ Adenosine Receptor. *ChemMedChem* 2020, 15, 1909-1920

Filippini, G; Amato, F; Rosso, C; Ragazzon, G; Vega-Peñaloza, A; Companyó, X; Dell'Amico, L; Bonchio, M; Prato, M. Mapping the Surface Groups of Amine-Rich Carbon Dots Enables Covalent Catalysis in Aqueous Media. *Chem* 2020, 6, 3022-3037

Andreozi, P; Tamberi, L; Tasca, E; Giacomazzo, GE; Martinez, M; Severi, M; Marradi, M; Cicchi, S; Moya, S; Biagiotti, G; Richichi, B. The B & B approach: Ball-milling conjugation of dextran with phenylboronic acid (PBA)-functionalized BODIPY. *Beilstein J. Org. Chem.* 2020, 16, 2272-2281

Roy, S; Zhu, DC; Parak, WJ; Feliu, N. Lysosomal Proton Buffering of Poly(ethylenimine) Measured In Situ by Fluorescent pH-Sensor Microcapsules. *ACS Nano* 2020, 14, 8012-8023

Sawalha, S; Milano, F; Guascito, MR; Bettini, S; Giotta, L; Operamolla, A; Da Ros, T; Prato, M; Valli, L. Improving 2D-organization of fullerene Langmuir-Schafer thin films by interaction with cellulose nanocrystals. *Carbon* 2020, 167, 906-917

Rosso, C; Filippini, G; Prato, M. Carbon Dots as Nano-Organocatalysts for Synthetic Applications. *ACS Catal.* 2020, 10, 8090-8105

Nerattini, F; Tubiana, L; Cardelli, C; Bianco, V; Dellago, C; Coluzza, I. Protein design under competing conditions for the availability of amino acids. *Sci. Rep.* 2020, 10, 2684

García-Astrain, C., Lenzi, E., Jiménez-de-Aberasturi, D., Henriksen-Lacey, M., R. Binelli, M., Liz-Marzán, LM. 3D-Printed Biocompatible Scaffolds with Built-In Nanoplasmonic Sensors. *Adv. Funct. Mater.* 2020, 30, 2005407

Velasco-Lozano, S; Jackson, E; Ripoll, M; López-Callego, F; Betancor, L. Stabilization of ω transaminase from *Pseudomonas fluorescens* by immobilization techniques. *Int. J. Biol. Macromol.* 2020, 164, 4318-4328

Hendel, T; Krivenkov, V; Sanchez-Iglesias, A; Grzelczak, M; Rakovich, YP. Strongly coupled exciton-plasmon nano hybrids reveal extraordinary resistance to harsh environmental stressors: Temperature, pH and irradiation. *Nanoscale* 2020, 12, 16875-16883

Szustakiewicz, P; Kowalska, N; Grzelak, D; Narushima, T; Gora, M; Bagiski, M; Pocięcha, D; Okamoto, H; Liz-Marzán, LM; Lewandowski, W. Supramolecular Chirality Synchronization in Thin Films of Plasmonic Nanocomposites. *ACS Nano* 2020, 14, 12918-12928

Mazzei, LF; Martínez, A; Trevisan, L; Rosa-Gastaldo, D; Cortajarena, AL; Mancin, F; Salassa, L. Toward supramolecular nanozymes for the photocatalytic activation of Pt(IV) anticancer prodrugs. *Chem. Commun.* 2020, 56, 10461-10464

Rodal-Cedeira, S; Vázquez-Arias, A; Bodelon, G; Skorikov, A; Núñez-Sánchez, S; La Porta, A; Polavarapu, L; Bals, S; Liz-Marzán, LM; Perez-Juste, J; Pastoriza-Santos, I. An Expanded Surface-Enhanced Raman Scattering Tags Library by Combinatorial Encapsulation of Reporter Molecules in Metal Nanoshells. *ACS Nano* 2020, 14, 14655-14664

Zanda, M; Colombano, A; Dall'Angelo, S; Kingston, L; Grönberg, G; Correia, C; Passannante, R; Baz, Z; Morcillo, MA; Elmore, C; Llop, J. 4,4,16-Trifluoropalmitate: Design, Synthesis, Tritiation, Radiofluorination and Preclinical PET Imaging Studies on Myocardial Fatty Acid Oxidation. *ChemMedChem* 2020, 15, 2317-2331

Sánchez-Iglesias, A; Zhuo, X; Albrecht, W; Bals, S; Liz-Marzán, LM. Tuning Size and Seed Position in Small Silver Nanorods. *ACS Mater. Lett.* 2020, 2, 1246-1250

Valenti, G; Melchionna, M; Montini, T; Boni, A; Nasi, L; Fonda, E; Criado, A; Zitolo, A; Voci, S; Bertoni, G; Bonchio, M; Fornasiero, P; Paolucci, F; Prato, M. Water-Mediated Electrohydrogenation of CO₂ at Near-Equilibrium Potential by Carbon Nanotubes/Cerium Dioxide Nano hybrids. *ACS Appl. Energy Mater.* 2020, 3, 8509-8518

Rejc, L; Gómez-Vallejo, V; Rios, X; Cossío, U; Baz, Z; Mujica, E; Gião, T; Cotrina, EY; Jiménez-Barbero, J; Quintana, J; Arsequell, G; Cardoso, I; Llop, J. Oral Treatment with Iododiflunisal Delays Hippocampal Amyloid-beta Formation in a Transgenic Mouse Model of Alzheimer's Disease: A Longitudinal *in vivo* Molecular Imaging Study. *J. Alzheimers Dis.* 2020, 77, 99-112

Robles-Vera, I; de la Visitación, N; Toral, M; Sánchez, M; Romero, M; Gómez-Guzmán, M; Yang, T; Izquierdo-García, JL; Guerra-Hernández, E; Ruiz-Cabello, J; Raizada, MK; Pérez-Vizcaíno, F; Jiménez, R; Duarte, J. Probiotic *Bifidobacterium breve* prevents DOCA-salt hypertension. *FASEB J.* 2020, 34, 13626-13640

Mendibil, U; Ruiz-Hernandez, R; Retegi-Carrion, S; Garcia-Urquia, N; Olalde-Graells, B; Abarrategi, A. **Tissue-Specific Decellularization Methods: Rationale and Strategies to Achieve Regenerative Compounds.** *Int. J. Mol. Sci.* 2020, 21, 5447

Minudri, D; Mantione, D; Dominguez-Alfaro, A; Moya, S; Maza, E; Bellacanzone, C; Antognazza, MR; Mecerreyes, D. **Water Soluble Cationic Poly(3,4-Ethylenedioxythiophene) PEDOT-N as a Versatile Conducting Polymer for Bioelectronics.** *Adv. Electron. Mater.* 2020, 6, 2000510

Gazzi, A; Fusco, L; Orecchioni, M; Ferrari, S; Franzoni, G; Yan, JS; Rieckher, M; Peng, GT; Lucherelli, MA; Vacchi, IA; Chau, NDQ; Criado, A; Istif, A; Mancino, D; Dominguez, A; Eckert, H; Vazquez, E; Da Ros, T; Nicolussi, P; Palermo, V; Schumacher, B; Cuniberti, G; Mai, YY; Clementi, C; Pasquali, M; Feng, XL; Kostarelos, K; Yilmazer, A; Bedognetti, D; Fadeel, B; Prato, M; Bianco, A; Delogu, LG. **Graphene, other carbon nanomaterials and the immune system: toward nanoimmunity-by-design.** *J. Phys. Mater.* 2020, 3, 034009

Milagres de Oliveira, T; Albrecht, W; González-Rubio, G; Altantzis, T; Lobato Hoyos, IP; Béché, A; Van Aert, S; Guerrero-Martínez, A; Liz-Marzán, LM; Bals, S. **3D Characterization and Plasmon Mapping of Gold Nanorods Welded by Femtosecond Laser Irradiation.** *ACS Nano* 2020, 14, 12558-12570

Vila-Parrondo, C; García-Astrain, C; Liz-Marzán, LM. **Colloidal systems toward 3D cell culture scaffolds.** *Adv. Colloid Interface Sci.* 2020, 283, 102237

Piebler, S; Dahring, H; Grandke, J; Goring, J; Couleaud, P; Aires, A; Cortajarena, AL; Courty, J; Latorre, A; Somoza, A; Teichgraber, U; Hilger, I. **Iron Oxide Nanoparticles as Carriers for DOX and Magnetic Hyperthermia after Intratumoral Application into Breast Cancer in Mice: Impact and Future Perspectives.** *Nanomaterials* 2020, 10, 1016

Domínguez-Vivero, C; Leira, Y; Saavedra-Piñeiro, M; Rodríguez-Osorio, X; Ramos-Cabrer, P; Villalba Martín, C; Sobrino, T; Campos, F; Castillo, J; Leira, R. **Iron Deposits in Periaqueductal Gray Matter Are Associated with Poor Response to OnabotulinumtoxinA in Chronic Migraine.** *Toxins* 2020, 12, 479

Aires, A; Möller, M; Cortajarena, AL. **Protein Design for the Synthesis and Stabilization of Highly Fluorescent Quantum Dots.** *Chem. Mater.* 2020, 32, 5729-5738

Achilli, S; Monteiro, JT; Serna, S; Mayer-Lambertz, S; Thépaut, M; Le Roy, A; Ebel, C; Reichardt, N; Lepenies, B; Fieschi, F; Vivès, C. **TETRALEC, Artificial Tetrameric Lectins: A Tool to Screen Ligand and Pathogen Interactions.** *Int. J. Mol. Sci.* 2020, 21, 5290

Lechuga-Vieco, AV; Latorre-Pellicer, A; Johnston, IG; Prota, G; Gileadi, U; Justo-Méndez, R; Acín-Pérez, R; Martínez-de-Mena, R; Fernández-Toro, JM; Jimenez-Blasco, D; Mora, A; Nicolás-Ávila, JA; Santiago, DJ; Priori, SG; Bolaños, JP; Sabio, G; Criado, LM; Ruiz-Cabello, J; Cerundolo, V; Jones, NS; Enríquez, JA. **Cell identity and nucleo-mitochondrial genetic context modulate OXPHOS performance and determine somatic heteroplasmy dynamics.** *Sci. Adv.* 2020, 6, eaba5345

Ardaya, M; Joya, A; Padro, D; Plaza-García, S; Gómez-Vallejo, V; Sánchez, M; Garbizu, M; Cossío, U; Matute, C; Cavaliere, F; Llop, J; Martín, A. **In vivo PET Imaging of Gliogenesis After Cerebral Ischemia in Rats.** *Front. Neurosci.* 2020, 14, 793

Hernansanz-Agustín, P; Choya-Foces, C; Carregal-Romero, S; Ramos, E; Oliva, T; Villa-Piña, T; Moreno, L; Izquierdo-Álvarez, A; Cabrera-García, JD; Cortés, A; Lechuga-Vieco, AV; Jادیya, P; Navarro, E; Parada, E; Palomino-Antolín, A; Tello, D; Acín-Pérez, R; Rodríguez-Aguilera, JC; Navas, P; Cogolludo, Á.; López-Montero, I; Martínez-del-Pozo, Á; Egea, J; López, MG; Elrod, JW; Ruiz-Cabello, J; Bogdanova, A; Enríquez, JA; Martínez-Ruiz, A. **Na⁺ controls hypoxic signalling by the mitochondrial respiratory chain.** *Nature* 2020, 586, 287

Guarra, F; Terenzi, A; Pirker, C; Passannante, R; Baier, D; Zangrando, E; Gómez-Vallejo, V; Biver, T; Gabbiani, C; Berger, W; Llop, J; Salassa, L. **¹²⁴I Radiolabeling of a Au^{III} -NHC Complex for In Vivo Biodistribution Studies.** *Angew. Chem. Int. Ed.* 2020, 59, 17130-17136

Lazaro-Carrillo, A; Calero, M; Aires, A; Cortajarena, AL; Simoes, BM; Latorre, A; Somoza, A; Clarke, RB; Miranda, R; Villanueva, A. **Tailored Functionalized Magnetic Nanoparticles to Target Breast Cancer Cells Including Cancer Stem-Like Cells.** *Cancers* 2020, 12, 1397

Galicia-García, U; Jebari, S; Larrea-Sebal, A; Uribe, KB; Siddiqi, H; Ostolaza, H; Benito-Vicente, A; Martín, C. **Statin Treatment-Induced Development of Type 2 Diabetes: From Clinical Evidence to Mechanistic Insights.** *Int. J. Mol. Sci.* 2020, 21, 4725

van Moolenbroek, GT; Patiño, T; Llop, J; Sánchez, S. **Engineering Intelligent Nanosystems for Enhanced Medical Imaging.** *Adv. Intell. Syst.* 2020, 2, 2000087

Mora-Sanz, V; Saa, L; Briz, N; Möller, M; Pavlov, V. **Antibody-Directed Synthesis of Catalytic Nanoclusters for Bioanalytical Assays.** *ACS Appl. Mater. Interfaces* 2020, 12, 28993-28999

Villa, JE; Garcia, I; Jiménez-de-Aberasturi, D; Pavlov, V; Sotomayor, MD; Liz-Marzán, LM. **SERS-based immunoassay for monitoring cortisol-related disorders.** *Biosens. Bioelectron.* 2020, 165, 112418

Fernandez-Luna, V; Fernandez-Blazquez, JP; Monclus, MA; Rojo, FJ; Daza, R; Sanchez-de Alcazar, D; Cortajarena, AL; Costa, RD. **Biogenic fluorescent protein-silk fibroin phosphors for high performing light-emitting diodes.** *Mater. Horiz.* 2020, 7, 1790-1800

Allegretto, JA; Iborra, A; Giussi, JM; von Biderling, C; Ceolín, M; Moya, S; Azzaroni, O; Rafti, M. **Growth of ZIF-8 MOF Films with Tunable Porosity by using Poly (1-vinylimidazole) Brushes as 3D Primers.** *Chem. Eur. J.* 2020, 26, 12388-12396

Linclau, B; Arda, A; Reichardt, NC; Sollogoub, M; Unione, L; Vincent, SP; Jimenez-Barbero, J. **Fluorinated carbohydrates as chemical probes for molecular recognition studies. Current status and perspectives.** *Chem. Soc. Rev.* 2020, 49, 3863-3888

Waclawiczek, A; Hamilton, A; Rouault-Pierre, K; Abarrategi, A; Albornoz, MG; Miraki-Moud, F; Bah, N; Gribben, J; Fitzgibbon, J; Taussig, D; Bonnet, D. **Mesenchymal niche remodeling impairs hematopoiesis via stanniocalcin 1 in acute myeloid leukemia.** *J. Clin. Invest.* 2020, 130, 3038-3050

Martinez-Moro, M; Jencyk, J; Giussi, JM; Jurga, S; Moya, SE. **Kinetics of the thermal response of poly(N-isopropylacrylamide co methacrylic acid) hydrogel microparticles under different environmental stimuli: A time-lapse NMR study.** *J. Colloid Interface Sci.* 2020, 580, 439-448

Rodriguez-Abetxuko, A; Muñumer, P; Okuda, M; Calvo, J; Knez, M; Beloqui, A. **Nanoconfined (Bio)Catalysts as Efficient Glucose-Responsive Nanoreactors.** *Adv. Funct. Mater.* 2020, 30, 2002990

Reguera, J; Flora, T; Winkelmanns, N; Rodriguez-Cabello, JC; Bals, S. **Self-assembly of Janus Au:Fe₃O₄ branched nanoparticles. From organized clusters to stimuli-responsive nanogel suprastructures.** *Nanoscale Adv.* 2020, 2, 2525-2530

Maibohm, C; Silvestre, OF; Borme, J; Sinou, M; Heggarty, K; Nieder, JB. **Multi-beam two-photon polymerization for fast large area 3D periodic structure fabrication for bioapplications.** *Sci. Rep.* 2020, 10, 8740

Polavarapu, L; Vila-Liarte, D; Feil, MW; Manzi, A; Garcia-Pomar, JL; Huang, H; Döblinger, M; Liz-Marzán, LM; Feldmann, J; Mihi, A. **Templated-Assembly of CsPbBr₃ Perovskite Nanocrystals into 2D Photonic Supercrystals with Amplified Spontaneous Emission.** *Angew. Chem. Int. Ed.* 2020, 59, 17750-17756

Navascuez, M; Dupin, D; Jürgen-Grande, H; Gómez-Vallejo, V; Loinaz, I; Cossío, U; Llop, J. **COSAN-stabilised omega-3 oil-in-water nanoemulsions to prolong lung residence time for poorly water soluble drugs.** *Chem. Commun.* 2020, 56, 8972-8975

Tasca, E; Andreozzi, P; Del Giudice, A; Galantini, L; Schillén, K; Giuliani, AM; de-los-Ángeles-Ramírez, M; Moya, S; Giustini, M. **Ploxamer/sodium cholate co-formulation for micellar encapsulation of doxorubicin with high efficiency for intracellular delivery: An *in-vitro* bioavailability study.** *J. Colloid Interface Sci.* 2020, 579, 551-561

González-Rubio, G; Mosquera, J; Kumar, V; Pedraza-Tardajos, A; Llombart, P; Solís, DM; Lobato, I; Noya, EG; Guerrero-Martínez, A; Taboada, JM; Obelleiro, F; MacDowell, LG; Bals, S; Liz-Marzán, LM. **Micelle-directed chiral seeded growth on anisotropic gold nanocrystals.** *Science* 2020, 368, 1472-1477

Millet, O; Cortajarena, AL; Salvatella, X; Jiménez-Barbero, J. **Scientific Response to the Coronavirus Crisis in Spain: Collaboration and Multidisciplinary.** *ACS Chem. Biol.* 2020, 15, 1722-1723

Liz-Marzán, LM; Kagan, CR; Millstone, JE. **Reproducibility in Nanocrystal Synthesis? Watch Out for Impurities!** *ACS Nano* 2020, 14, 6359-6361

Filgueiras-Rama, D; Vasiljevic, J; Jalife, J; Noujaim, SF; Alfonso, JM; Nicolas-Avila, JA; Gutierrez, C; Zamarreño, N; Hidalgo, A; Bernabé, A; Cop, CP; Ponce-Balbuena, D; Guerrero-Serna, G; Calle, D; Desco, M; Ruiz-Cabello, J; Nieto, A; Falcon, A. **Human influenza A virus causes myocardial and cardiac-specific conduction system infections associated with early inflammation and premature death.** *Cardiovasc. Res.* 2020, 117, 876-889

Rivera, LMR; Machado, JG; Chandra Mathpal, M; Chaves, NL; Gregurec, D; Bão, SN; Paterno, LG; Moya, S; Azevedo, RB; Soler, MAG. **Functional glucosamine-iron oxide nanocarriers.** *J. Mater. Res.* 2020, 35, 1726-1737

Auzmendi-Iriarte, J; Saenz-Antonanzas, A; Mikelez-Alonso, I; Carrasco-Garcia, E; Tellaetxe-Abete, M; Lawrie, CH; Sampron, N; Cortajarena, AL; Matheu, A. **Characterization of a new small-molecule inhibitor of HDAC6 in glioblastoma.** *Cell Death Dis.* 2020, 11, 417

Zhuo, X; Henriksen-Lacey, M; Jiménez-de-Aberasturi, D; Sánchez-Iglesias, A; Liz-Marzán, LM. **Shielded Silver Nanorods for Bioapplications.** *Chem. Mater.* 2020, 32, 5879-5889

Sawalha, S; Silvestri, A; Criado, A; Bettini, S; Prato, M; Valli, L. **Tailoring the sensing abilities of carbon nanodots obtained from olive solid wastes.** *Carbon* 2020, 167, 696-708

Aspermair, P; Ramach, U; Reiner-Rozman, C; Fossati, S; Lechner, B; Moya, S; Azzaroni, O; Dostalek, J; Szunerits, S; Knoll, W; Binting, J. **Dual Monitoring of Surface Reactions in Real Time by Combined Surface-Plasmon Resonance and Field-Effect Transistor Interrogation.** *J. Am. Chem. Soc.* 2020, 142, 11709-11716

Yang, M; Liu, H; Qiu, C; Iatsunskyi, I; Coy, E; Moya, S; Wang, Z; Wu, W; Zhao, X; Wang, G. **Electron transfer correlated antibacterial activity of biocompatible graphene Nanosheets-TiO₂ coatings.** *Carbon* 2020, 166, 350-360

Zhao, J; Lu, D; Moya, S; Yan, H; Qiu, M; Chen, J; Wang, X; Li, Y; Pan, H; Chen, G; Wang, G. **Bispecific T-cell engager (BiTE) immunotherapy of ovarian cancer based on MIL-88A MOF/MC gene delivery system.** *Appl. Mater. Today* 2020, 20, 100701

de Brito, JLM; Lima, VNd; Ansa, DO; Moya, S; Morais, PC; Azevedo, RBd; Lucci, CM. **Acute reproductive toxicology after intratesticular injection of silver nanoparticles (AgNPs) in Wistar rats.** *Nanotoxicology* 2020, 14, 893-907

Lewandowski, W; Vaupoti, N; Pocięcha, D; Górecka, E; Liz-Marzán, LM. **Chirality of Liquid Crystals Formed from Achiral Molecules Revealed by Resonant X-Ray Scattering.** *Adv. Mater.* 2020, 32, 1905591

Vanrompay, H; Buurlage, J.W.; Pelt, D.M.; Kumar, V.; Zhuo, X.L.; Liz-Marzán, L.M.; Bals, S.; Batenburg, KJ. **Real-Time Reconstruction of Arbitrary Slices for Quantitative and In Situ 3D Characterization of Nanoparticles.** *Part. Part. Syst. Charact.* 2020, 37, 2000073

Sasselli, IR; Syrgiannis, Z. **Small Molecules Organic Co-Assemblies as Functional Nanomaterials.** *Eur. J. Org. Chem.* 2020, 2020, 5305-5318

Okrugin, BM; Richter, RP; Leermakers, FAM; Neelov, IM; Zhulina, EB; Borisov, OV. **Electroresponsive Polyelectrolyte Brushes Studied by Self-Consistent Field Theory.** *Polymers* 2020, 12, 898

Beloqui, A; Cortajarena, AL. **Protein-based functional hybrid bionanomaterials by bottom-up approaches.** *Curr. Opin. Struct. Biol.* 2020, 63, 74-81

Fernandez-Barahona, I; Muñoz-Hernando, M; Ruiz-Cabello, J; Herranz, F; Pellico, J. **Iron Oxide Nanoparticles: An Alternative for Positive Contrast in Magnetic Resonance Imaging.** *Inorganics* 2020, 8, 28

Cioce, A; Thépaut, M; Fieschi, F; Reichardt, N. **Rapid On-Chip Synthesis of Complex Glycomimetics from N-Glycan Scaffolds for Improved Lectin Targeting.** *Chem. Eur. J.* 2020, 26, 12809-12817

□

Höller, RPM; Kuttner, C; Mayer, M; Wang, R; Dulle, M; Contreras-Caceres, R; Fery, A; Liz-Marzán, LM. **Colloidal Superstructures with Triangular Cores: Size Effects on SERS Efficiency.** *ACS Photonics* 2020, 7, 1839-1848

Cacioppo, M; Scharl, T; Dordevic, L; Cadranel, A; Arcudi, F; Galdi, DM; Prato, M. **Symmetry-Breaking Charge-Transfer Chromophore Interactions Supported by Carbon Nanodots.** *Angew. Chem. Int. Ed.* 2020, 59, 12779-12784

Giao, T; Saavedra, J; Cotrina, E; Quintana, J; Llop, J; Arsequell, G; Cardoso, I. **Undiscovered Roles for Transthyretin: From a Transporter Protein to a New Therapeutic Target for Alzheimer's Disease.** *Int. J. Mol. Sci.* 2020, 21, 2075

Moreno-Cugnon, L; Arrizabalaga, O; Llarena, I; Matheu, A. **Elevated p38MAPK activity promotes neural stem cell aging.** *Aging* 2020, 12, 6030-3036

Padro, D; Cienskowski, P; Lopez-Fernandez, S; Chakraborty, I; Carrillo-Carrión, C; Feliu, N; Parak, WJ; Carril, M. **Toward Diffusion Measurements of Colloidal Nanoparticles in Biological Environments by Nuclear Magnetic Resonance.** *Small* 2020, 16, 2001160

Díez-Buitrago, B; Fernández-SanArgimiro, F; Lorenzo, J; Briz, N; Pavlov, V. **Modification of chlorosulfonated polystyrene substrates for bioanalytical applications.** *Mater. Sci. Eng. C* 2020, 112, 110912

Tarnowicz-Staniak, N; Vázquez-Díaz, S; Pavlov, V; Matczyszyn, K; Grzelczak, M. **Cellulose as an Inert Scaffold in Plasmon-Assisted Photoregeneration of Cofactor Molecules.** *ACS Appl. Mater. Interfaces* 2020, 12, 19377-19383

Cañadas-Lozano, D; Marín-Aguilar, F; Castejón-Vega, B; Ryffel, B; Navarro-Pando, JM; Ruiz-Cabello, J; Alcocer-Gómez, E; Bullón, P; Cordero, MD. **Blockade of the NLRP₃ inflammasome improves metabolic health and lifespan in obese mice.** *Geroscience* 2020, 42, 715-725

Izidoro, MA; Cecconi, A; Panadero, MI; Mateo, J; Godzien, J; Vilchez, JP; López-González, A; Ruiz-Cabello, J; Ibañez, B; Barbas, C; Rupérez, FJ. **Plasma Metabolic Signature of Atherosclerosis Progression and Colchicine Treatment in Rabbits.** *Sci. Rep.* 2020, 10, 7072

Bolívar, JM; Gallego, FL. **Characterization and evaluation of immobilized enzymes for applications in flow reactors.** *Curr. Opin. Green Sustain. Chem.* 2020, 25, 100349

Carregal-Romero, S; Fadón, L; Berra, E; Ruiz-Cabello, J. **MicroRNA Nanotherapeutics for Lung Targeting. Insights into Pulmonary Hypertension.** *Int. J. Mol. Sci.* 2020, 21, 3253

□

Sanchez-Cano, C; Carril, M. Recent Developments in the Design of Non-Biofouling Coatings for Nanoparticles and Surfaces. *Int. J. Mol. Sci.* 2020, 21, 1007

Bettini, S; Syrgiannis, Z; Ottolini, M; Bonfrate, V; Giancane, G; Valli, L; Prato, M. Supramolecular Chiral Discrimination of D-Phenylalanine Amino Acid Based on a Perylene Bisimide Derivative. *Front. Bioeng. Biotechnol.* 2020, 8, 160

Rios-Lombardia, N; Rodríguez-Álvarez, MJ; Moris, F; Kourist, R; Comino, N; Lopez-Gallego, F; González-Sabín, J; García-Álvarez, J. DESign of Sustainable One-Pot Chemoenzymatic Organic Transformations in *Deep Eutectic Solvents* for the Synthesis of 1,2-Disubstituted Aromatic Olefins. *Front. Chem.* 2020, 8, 139

Correia, DM; Fernandes, LC; Martins, PM; García-Astrain, C; Costa, CM; Reguera, J; Lanceros-Méndez, S. Ionic Liquid-Polymer Composites: A New Platform for Multifunctional Applications. *Adv. Funct. Mater.* 2020, 30, 1909736

Terren, I; Orrantia, A; Mikelez-Alonso, I; Vitalle, J; Zenarruzabeitia, O; Borrego, F. NK Cell-Based Immunotherapy in Renal Cell Carcinoma. *Cancers* 2020, 12, 316

Plou, J; García, I; Charconnet, M; Astobiza, I; García-Astrain, C; Matricardi, C; Mihi, A; Carracedo, A; Liz-Marzán, LM. Multiplex SERS Detection of Metabolic Alterations in Tumor Extracellular Media. *Adv. Funct. Mater.* 2020, 30, 1910335

Espasa, A; Lang, M; Aguino, CF; Sanchez-de-Alcazar, D; Fernandez-Blazquez, JP; Sonnewald, U; Cortajarena, AL; Coto, PB; Costa, RD. Long-living and highly efficient bio-hybrid light-emitting diodes with zero-thermal-quenching biophosphors. *Nat. Commun.* 2020, 11, 879

Velasco-Lozano, S; Santiago-Arcos, J; Mayoral, JA; López-Gallego, F. Co-immobilization and Colocalization of Multi-Enzyme Systems for the Cell-Free Biosynthesis of Aminoalcohols. *ChemCatChem* 2020, 12, 3030-3041

Martín-Sánchez, C; Sánchez-Iglesias, A; Mulvaney, P; Liz-Marzán, LM; Rodriguez, F. Plasmonic Sensing of Refractive Index and Density in Methanol-Ethanol Mixtures at High Pressure. *J. Phys. Chem. C* 2020, 124, 8978–8983

Mauri, M; Collica, V; Morelli, L; Das, P; Garcia, I; Peñaranda, J; Bellini, M; Rotem, R; Truffi, M; Corsi, F; Simonutti, R; Liz-Marzán, LM; Colombo, M; Prosperi, D. MnO Nanoparticles Embedded in Functional Polymers as T₁ Contrast Agents for Magnetic Resonance Imaging. *ACS Appl. Nano Mater.* 2020, 3, 3787–3797

Waszkielewicz, M; Olesiak-Banska, J; Grzelczak, M; Sanchez-Iglesias, A; Pniakowska, A; Samoc, M. Enhanced one-photon and two-photon excited luminescence of polymer-stabilized AuAg nanoclusters aggregates. *J. Lumin.* 2020, 221, 116994

Heller, DA; Jena, PV; Pasquali, M; Kostarelos, K; Delogu, LG; Meidl, RE; Rotkin, SV; Scheinberg, DA; Schwartz, RE; Terrones, M; Wang, YH; Bianco, A; Boghossian, AA; Cambre, S; Cagnet, L; Corrie, SR; Demokritou, P; Giordani, S; Hertel, T; Ignatova, T; Islam, MF; Iverson, NM; Jagota, A; Janas, D; Kono, J; Kruss, S; Landry, MP; Li, Y; Martel, R; Maruyama, S; Naumov, AV; Prato, M; Quinn, SJ; Roxbury, D; Strano, MS; Tour, JM; Weisman, RB; Wenseleers, W; Yudasaka, M. Banning carbon nanotubes would be scientifically unjustified and damaging to innovation. *Nat. Nanotechnol.* 2020, 15, 164-166

Fusco, L; Pelin, M; Mukherjee, S; Keshavan, S; Sosa, S; Martin, C; Gonzalez, V; Vazquez, E; Prato, M; Fadeel, B; Tubaro, A. Keratinocytes are capable of selectively sensing low amounts of graphene-based materials: Implications for cutaneous applications. *Carbon* 2020, 159, 598-610

Lillo, CR; Calienni, MN; Aiello, BR; Prieto, MJ; Sartori, DR; Tuninetti, J; Toledo, P; del-Valle-Alonso, S; Moya, S; González, MC; Montanari, J; Soler-Illia, GJ. BSA-capped gold nanoclusters as potential theragnostic for skin diseases: Photoactivation, skin penetration, *in vitro*, and *in vivo* toxicity. *Mater. Sci. Eng. C* 2020, 112, 110891

Velasco, C; Mota-Cobián, A; Mota, RA; Pellico, J; Herranz, F; Galán-Arriola, C; Ibáñez, B; Ruiz-Cabello, J; Mateo, J; España, S. Quantitative assessment of myocardial blood flow and extracellular volume fraction using ⁶⁸Ga-DOTA-PET: A feasibility and validation study in large animals. *J. Nucl. Cardiol.* 2020, 27, 1249-1260

Marín-Aguilar, F; Castejón-Vega, B; Alcocer-Gómez, E; Lendines-Cordero, D; Cooper, MA; de la Cruz, P; Andújar-Pulido, E; Pérez-Alegre, M; Muntané, J; Pérez-Pulido, AJ; Ryffel, B; Robertson, AAB; Ruiz-Cabello, J; Bullón, P; Cordero, MD. NLRP3 Inflammasome Inhibition by MCC950 in Aged Mice Improves Health via Enhanced Autophagy and PPAR alpha Activity. *J. Gerontol. A Biol. Sci. Med. Sci.* 2020, 75, 1457-1464

Aires, A; Fernández-Luna, V; Fernández-Cestau, J; Costa, RD; Cortajarena, AL. White-emitting Protein-Metal Nanocluster Phosphors for Highly Performing Biohybrid Light-Emitting Diodes. *Nano Lett.* 2020, 20, 2710-2716

Bolitho, EM; Sánchez-Cano, C; Huang, HY; Hands-Portman, I; Spink, M; Quinn, PD; Harkiolaki, M; Sadler, PJ. X-ray tomography of cryopreserved human prostate cancer cells: mitochondrial targeting by an organoiridium photosensitizer. *J. Biol. Inorg. Chem.* 2020, 25, 295-303

Martínez-Banderas, AI; Aires, A; Plaza-García, S; Colás, L; Moreno, JA; Ravasi, T; Merzaban, JS; Ramos-Cabrer, P; Cortajarena, AL; Kosel, J. Magnetic core-shell nanowires as MRI contrast agents for cell tracking. *J. Nanobiotechnology* 2020, 18, 42

Mikelez-Alonso, I; Aires, A; Cortajarena, AL. Cancer Nano-Immunotherapy from the Injection to the Target: The Role of Protein Corona. *Int. J. Mol. Sci.* 2020, 21, 519

Melchionna, M; Fornasiero, P; Prato, M. Into the carbon: A matter of core and shell in advanced electrocatalysis. *APL Mater.* 2020, 8, 020905

Cotrina, EY; Gimeno, A; Llop, J; Jiménez-Barbero, J; Quintana, J; Valencia, G; Cardoso, I; Prohens, R; Arsequell, G. Calorimetric Studies of Binary and Ternary Molecular Interactions between Transthyretin, A beta Peptides, and Small-Molecule Chaperones toward an Alternative Strategy for Alzheimer's Disease Drug Discovery. *J. Med. Chem.* 2020, 63, 3205-3214

Espinosa, A; Reguera, J; Curcio, A; Muñoz-Noval, A; Kuttner, C; van de Walle, A; Liz-Marzan, LM; Wilhelm, C. Janus Magnetic-Plasmonic Nanoparticles for Magnetically Guided and Thermally Activated Cancer Therapy. *Small* 2020, 16, 1904960

Bell, SEJ; Charron, G; Cortés, E; Kneipp, J; de la Chapelle, ML; Langer, J; Prochazka, M; Tran, V; Schlucker, S. Towards Reliable and Quantitative Surface-Enhanced Raman Scattering (SERS): From Key Parameters to Good Analytical Practice. *Angew. Chem. Int. Ed.* 2020, 59, 5454-5462

Rauti, R; Secomandi, N; Martín, C; Bosi, S; Severino, FPU; Scaini, D; Prato, M; Vázquez, E; Ballerini, L. Tuning Neuronal Circuit Formation in 3D Polymeric Scaffolds by Introducing Graphene at the Bio/Material Interface. *Adv. Biosys.* 2020, 4, 1900233

Falciani, C; Zevolini, F; Brunetti, J; Riolo, G; Gracia, R; Marradi, M; Loinaz, I; Ziemann, C; Cossío, U; Llop, J; Bracci, L; Pini, A. Antimicrobial Peptide-Loaded Nanoparticles as Inhalation Therapy for *Pseudomonas aeruginosa* Infections. *Int. J. Nanomed.* 2020, 15, 1117-1128

Videira, MA; Llop, J; Sousa, C; Kreutzer, B; Cossío, U; Forbes, B; Vieira, I; Gil, N; Silva-Lima, B. Pulmonary Administration: Strengthening the Value of Therapeutic Proximity. *Front. Med.* 2020, 7, 50

Osorio-Querejeta, I; Carregal-Romero, S; Ayerdi-Izquierdo, A; Mäger, I; A., NL; Wood, M; Egimendia, A; Betanzos, M; Alberro, A; Iparraguirre, L; Moles, L; Larena, I; Möller, M; Goñi-de-Cerio, F; Bijelic, G; Ramos-Cabrer, P; Muñoz-Culla, M; Otaegui, D. MiR-219a-5p Enriched Extracellular Vesicles Induce OPC Differentiation and EAE Improvement More Efficiently Than Liposomes and Polymeric Nanoparticles. *Pharmaceutics* 2020, 12, 186

Mosquera, J; García, I; Henriksen-Lacey, M; Martínez-Calvo, M; Dhanjani, M; Mascareñas, JL; Liz-Marzán, LM. Reversible Control of Protein Corona Formation on Gold Nanoparticles Using Host-Guest Interactions. *ACS Nano* 2020, 14, 5382-5391

Candotto Carniel, F; Fortuna, L; Nepi, M; Cai, G; Del Casino, C; Adami, G; Bramini, M; Bosi, S; Flahaut, E; Martín, C; Vázquez, E; Prato, M; Tretiach, M. Beyond graphene oxide acidity: Novel insights into graphene related materials effects on the sexual reproduction of seed plants. *J. Hazard. Mater.* 2020, 393, 122380

Jiménez-de-Aberasturi, D; Henriksen-Lacey, M; Littl, L; Langer, J; Liz-Marzán, LM. Using SERS Tags to Image the Three-Dimensional Structure of Complex Cell Models. *Adv. Funct. Mater.* 2020, 30, 1909655

Pedatella, S; Cerchia, C; Manfra, M; Cioce, A; Bolognese, A; Lavecchia, A. Antitumor agents 7. Synthesis, antiproliferative activity and molecular modeling of new L-lysine-conjugated pyridophenoxazinones as potent DNA-binding ligands and topoisomerase IIa inhibitors. *Eur. J. Med. Chem.* 2020, 187, 111960

García-García, A; Ceballos-Laita, L; Serna, S; Artschwager, R; Reichardt, NC; Corzana, F; Hurtado-Guerrero, R. Structural basis for substrate specificity and catalysis of alpha 1,6-fucosyltransferase. *Nat. Commun.* 2020, 11, 973

Meesaragandla, B; García, I; Biedenweg, D; Toro-Mendoza, J; Coluzza, I; Liz-Marzán, LM; Delcea, M. H-Bonding-mediated binding and charge reorganization of proteins on gold nanoparticles. *Phys. Chem. Chem. Phys.* 2020, 22, 4490-4500

Ye, W; Krüger, K; Sánchez-Iglesias, A; García, I; Jia, X; Sutter, J; Celiksoy, S; Foerster, B; Liz-Marzán, LM; Ahijado-Guzmán, R; Sönnichsen, C. CTAB Stabilizes Silver on Gold Nanorods. *Chem. Mater.* 2020, 32, 1650-1656

Robles-Vera, I; Toral, M; de-la-Visitación, N; Sánchez, M; Gómez-Guzmán, M; Romero, M; Yang, T; Izquierdo-García, JL; Jimenez, R; Ruiz-Cabello, J; Guerra-Hernández, E; Raizada, MK; Pérez-Vizcaino, F; Duarte, J. Probiotics Prevent Dysbiosis and the Rise in Blood Pressure in Genetic Hypertension: Role of Short-Chain Fatty Acids. *Mol. Nutr. Food Res.* 2020, 64, 1900616

Omachi, H; Inoue, T; Hatao, S; Shinohara, H; Criado, A; Yoshikawa, H; Syrgiannis, Z; Prato, M. Concise, Single-Step Synthesis of Sulfur-Enriched Graphene: Immobilization of Molecular Clusters and Battery Applications. *Angew. Chem. Int. Ed.* 2020, 59, 7836-7841

Bianco, V; Franzese, G; Coluzza, I. In Silico Evidence That Protein Unfolding is a Precursor of Protein Aggregation. *ChemPhysChem* 2020, 21, 377-384

Backes C., Abdelkader A.M., Alonso C., Andrieux-Ledier A, Arenal R, Azpeitia J, Balakrishnan N, Banszerus L, Barjon J, Bartali R, Bellani S, Berger C, Berger R, Bernal Ortega M.M., Bernard C, Beton P.H., Beyer A, Bianco A, Bøggild P, Bonaccorso F, Borin Barin G, Botas C, Bueno R.A, Carriazo D, Castellanos-Gomez A, Christian M, Ciesielski A, Ciuk T, Cole M.T., Coleman J, Coletti C, Crema L, Cun .H, Dasler D, De Fazio D, Díez N, Drieschner S, Duesberg G.S, Fasel R, Feng X, Fina A, Forti S, Costas G, Garberoglio G, García J.M., Garrido J.A, Gibertini M, Götzhäuser A, Gómez J, Greber T, Hauke F, Hemmi A, Hernandez-Rodriguez I, Hirsch A, Hodge S.A, Yes Huttel, Jepsen P.U, Jimenez I, Kaiser U, Kaplas T, HoKwon K, Kis A, Papagelis K, Kostarelos K, Krajewska A, Lee K, Li C, Lipsanen H, Liscio A, Lohe M.R, Loiseau A, Lombardi L, López M.F, Martín O, Martín C, Martínez L, Martín-Gago J.A, Martínez J.I, Marzari N, Mayoral A, McManus J, Melucci M, Méndez J, Merino C, Merino P, Meyer A.P, Miniussi E, Miseikis V, Mishra N, Morandi V, Munuera C, Muñoz R, Nolan H, Ortolani L, Ott A.K, Palacio I, Palermo V, Parthenios J, Pasternak I, Patane A, Prato M, Prevost H, Prudkovskiy V, Pugno N, Rojo T, Rossi A, Ruffieux P, Samori P, Schué L, Setijadi E, Seyller T, Speranza G, Stampfer C, Stenger I, Strupinski W, Svirko Y, Taioli S, Teo D.B.K, Testi M, Tomarchio F, Tortello M, Treossi E, Turchanin A, Vazquez E, Villaro E, Whelan P.R, Xia Z, Yakimova R, Yang S, Yazdi G.R, Yim C, Yoon D, Zhang X, Zhuang X, Colombo L, Ferrari A.C, García-Hernández M. Production and processing of graphene and related materials. *2D Mater.* 2020, 7, 022001

Rodríguez, RC; Troiani, H; Moya, S; Bruno, MM; Angelomé, PC. Bimetallic Ag-Au Nanoparticles Inside Mesoporous Titania Thin Films: Synthesis by Photoreduction and Galvanic Replacement, and Catalytic Activity. *Eur. J. Inorg. Chem.* 2020, 2020, 568-574

Fusco, L; Garrido, M; Martin, C; Sosa, S; Ponti, C; Centeno, A; Alonso, B; Zurutuza, A; Vázquez, E; Tubaro, A; Prato, M; Pelin, M. Skin irritation potential of graphene-based materials using a non-animal test. *Nanoscale* 2020, 12, 610-622

Liu, ZY; Escudero, A; Carrillo-Carrión, C; Chakraborty, I; Zhu, DC; Gallego, M; Parak, WJ; Feliu, N. Biodegradation of Bi-Labeled Polymer-Coated Rare-Earth Nanoparticles in Adherent Cell Cultures. *Chem. Mater.* 2020, 32, 245-254

Benazzi, E; Rettenmaier, K; Berger, T; Caramori, S; Berardi, S; Argazzi, R; Prato, M; Syrgiannis, Z. Photoelectrochemical Properties of SnO₂ Photoanodes Sensitized by Cationic Perylene-Di-Imide Aggregates for Aqueous HBr Splitting. *J. Phys. Chem. C* 2020, 124, 1317-1329

Bordoni, AV; Zalduendo, MM; Escobar, A; Amenitsch, H; Moya, S; Angelomé, PC. Phosphonate mesoporous hybrid thin films: Synthesis of organophosphosilane by thiol-ene click chemistry and applications in formation and stabilization of silver nanoparticles. *Micropor. Mesopor. Mat.* 2020, 295, 109958

Allegretto, JA; Giussi, JM; Moya, S; Azzaroni, O; Rafti, M. Synthesis and characterization of thermoresponsive ZIF-8@PNIPAm-co-MAA microgel composites with enhanced performance as an adsorption/release platform. *RSC Adv.* 2020, 10, 2453-2461

Giussi, JM; Martínez-Moro, M; Iborra, A; Cortez, ML; Di Silvio, D; Llarena, I; Longo, GS; Azzaroni, O; Moya, S. A study of the complex interaction between poly allylamine hydrochloride and negatively charged poly(*N*-isopropylacrylamide-co-methacrylic acid) microgels. *Soft Matter* 2020, 16, 881-890

Tripathi, A; Rode, CV; Llop, J; Chavan, SP; Joshi, SM. An enolate-mediated regioselective synthesis of 1,2,3-triazoles via azide-aldehydes or ketones [3+2]-cycloaddition reactions in aqueous phase. *Tetrahedron Lett.* 2020, 61, 151662

Domínguez-Alfaro, A; Alegret, N; Arnaiz, B; González-Domínguez, JM; Martín-Pacheco, A; Cossío, U; Porcarelli, L; Bosi, S; Vázquez, E; Mecerreyes, D; Prato, M. Tailored Methodology Based on Vapor Phase Polymerization to Manufacture PEDOT/CNT Scaffolds for Tissue Engineering. *ACS Biomater. Sci. Eng.* 2020, 6, 1269-1278

García-Álvarez, R; Chen, L; Nedilko, A; Rix, A; Lederle, W; Pathak, V; Lammers, T; von Plessen, G; Kostarelos, K; Liz-Marzán, LM; Kuehne, AJC; Chigrin, DN. Optimizing the Geometry of Photoacoustically Active Gold Nanoparticles for Biomedical Imaging. *ACS Photonics* 2020, 7, 646-652

Tizei, LH; Mkhitarjan, V; Lourenço-Martins, H; Scarabelli, L; Watanabe, K; Taniguchi, T; Tencé, M; Blazit, J; Li, X; Gloter, A; Zobelli, A; Schmidt, F; Liz-Marzán, LM; García de Abajo, FJ; Stephan, O; Kociak, M. Tailored Nanoscale Plasmon-Enhanced Vibrational Electron Spectroscopy. *Nano Lett.* 2020, 20, 2973

González-Rubio, G; Scarabelli, L; Guerrero-Martínez, A; Liz-Marzán, LM. **Surfactant-Assisted Symmetry Breaking in Colloidal Gold Nanocrystal Growth.** *ChemNanoMat* 2020, 6, 698-707

Zhang, Y; García-Gabilondo, M; Grayston, A; Feiner, IVJ; Antón-Sales, I; Lloja, RA; Llop, J; Ramos-Cabrer, P; Barba, I; García-Dorado, D; Gosselet, F; Rosell, A; Roig, A. **PLGA protein nanocarriers with tailor-made fluorescence/MRI/PET imaging modalities.** *Nanoscale* 2020, 12, 4988-5002

Nerattini, F; Figliuzzi, M; Cardelli, C; Tubiana, L; Bianco, V; Dellago, C; Coluzza, I. **Identification of Protein Functional Regions.** *ChemPhysChem* 2020, 21, 335-347

Adrover, JM; Aroca-Crevillén, A; Crainiciuc, G; Ostos, F; Rojas-Vega, Y; Rubio-Ponce, A; Cilloniz, C; Bonzón-Kulichenko, E; Calvo, E; Rico, D; Moro, MA; Weber, C; Lizasoain, I; Torres, A; Ruiz-Cabello, J; Vázquez, J; Hidalgo, A. **Programmed 'disarming' of the neutrophil proteome reduces the magnitude of inflammation.** *Nat. Immunol.* 2020, 21, 135-144

González-Rubio, G; Milagres de Oliveira, T; Albrecht, W; Díaz-Núñez, P; Castro-Palacio, JC; Prada, A; González, RI; Scarabelli, L; Bañares, L; Rivera, A; Liz-Marzán, LM; Peña-Rodríguez, O; Bals, S; Guerrero-Martínez, A. **Formation of Hollow Gold Nanocrystals by Nanosecond Laser Irradiation.** *J. Phys. Chem. Lett.* 2020, 11, 670

Liutkus, M; López-Andarias, A; Mejías, SH; López-Andarias, J; Gil-Carton, D; Feixas, F; Osuna, S; Matsuda, W; Sakurai, T; Seki, S; Atienza, C; Martín, N; Cortajarena, AL. **Protein-directed crystalline 2D fullerene assemblies.** *Nanoscale* 2020, 12, 3614-3622

Rivilla, I; Odriozola-Gimeno, M; Aires, A; Gimeno, A; Jiménez-Barbero, J; Torrent-Sucarrat, M; Cortajarena, AL; Cossío, FP. **Discovering Biomolecules with Huisgenase Activity: Designed Repeat Proteins as Biocatalysts for (3+2) Cycloadditions.** *J. Am. Chem. Soc.* 2020, 142, 762-776

Escobar, A; Muzzio, NE; Martínez, A; Abarategi, A; Bindini, E; Grzelczak, M; Bordoni, AV; Angelomé, PC; Moya, S. **Mesoporous titania coatings with carboxylated pores for complexation and slow delivery of strontium for osteogenic induction.** *Appl. Surf. Sci.* 2020, 510, 145172

Merino, JP; Serna, S; Criado, A; Centeno, A; Napal, I; Calvo, J; Zurutuza, A; Reichardt, N; Prato, M. **Mass spectrometry of carbohydrate-protein interactions on a glycan array conjugated to CVD graphene surfaces.** *2D Mater.* 2020, 7, 024003

De Leoz, MLA; Duewer, DL; Fung, A; Liu, L; Yau, HK; Potter, O; Staples, GO; Furuki, K; Frenkel, R; Hu, Y; Sosic, Z; Zhang, P; Altmann, F; Gruber, C; Shao, C; Zaia, J; Evers, W; Pangelley, S; Suckau, D; Wiechmann, A; Resemann, A; Jabs, W; Beck, A; Froehlich, JW; Huang, C; Li, Y; Liu, Y; Sun, S; Wang, Y; Seo, Y; An, HJ; Reichardt, N; Ruiz, JE; Archer-Hartmann, S; Azadi, P; Bell, L; Lakos, Z; An, Y; Cipollo, JF; Pucic-Bakovic, M; Stambuk, J; Lauc, G; Li, X; Wang, PG; Bock, A; Hennig, R; Rapp, E; Creskey, M; Cyr, T; Nakano, M. **et al. NIST Interlaboratory Study on Glycosylation Analysis of Monoclonal Antibodies: Comparison of Results from Diverse Analytical Methods.** *Mol. Cell Proteomics* 2020, 19, 11-30

Gurruchaga-Pereda, J; Martínez-Martínez, V; Rezabal, E; López, X; Garino, C; Mancin, F; Cortajarena, AL; Salassa, L. **Flavin Bioorthogonal Photocatalysis Toward Platinum Substrates.** *ACS Catal.* 2020, 10, 187-196

Baginski, M; Tupikowska, M; González-Rubio, G; Wojcik, M; Lewandowski, W. **Shaping Liquid Crystals with Gold Nanoparticles: Helical Assemblies with Tunable and Hierarchical Structures Via Thin-Film Cooperative Interactions.** *Adv. Mater.* 2020, 32, 1904581

Marin-Aguilar, F; Lechuga-Vieco, AV; Alcócer-Gómez, E; Castejón-Vega, B; Lucas, J; Garrido, C; Peralta-García, A; Pérez-Pulido, AJ; Varela-López, A; Quiles, JL; Ryyfel, B; Flores, I; Bullon, P; Ruiz-Cabello, J; Cordero, MD. **NLRP3 inflammasome suppression improves longevity and prevents cardiac aging in male mice.** *Aging Cell* 2020, 19, e13050

Langer, J; Jiménez-de-Aberasturi, D; Aizpurua, J; Alvarez-Puebla, RA; Auguie, B; Baumberg, JJ; Bazan, GC; Bell, SEJ; Boisen, A; Brolo, AG; Choo, J; Cialla-May, D; Deckert, V; Fabris, L; Faulds, K; García de Abajo, FJ; Goodacre, R; Graham, D; Haes, AJ; Haynes, CL; Huck, C; Itoh, T; Käll, M; Kneipp, J; Kotov, NA; Kuang, H; Le Ru, EC; Lee, HK; Li, J; Ling, XY; Maier, S; Mayerhoefer, T; Moskovits, M; Murakoshi, K; Nam, J; Nie, S; Ozaki, Y; Pastoriza-Santos, I; Pérez-Juste, J; Popp, J; Pucci, A; Reich, S; Ren, B; Schatz, GC; Shegai, T; Schlücker, S; Li-Lin, T; Thomas, KG; Ti. **Present and Future of Surface-Enhanced Raman Scattering.** *ACS Nano* 2020, 14, 28-117

Litti, L; Reguera, J; García de Abajo, FJ; Meneghetti, M; Liz-Marzán, LM. **Manipulating chemistry through nanoparticle morphology.** *Nanoscale Horiz.* 2020, 5, 102

Pulagam, KR; Gómez-Vallejo, V; Llop, J; Rejc, L. **Radiochemistry: A Useful Tool in the Ophthalmic Drug Discovery.** *Curr. Med. Chem.* 2020, 27, 501 - 522

Mosquera, J; Zhao, Y; Jang, H; Xie, N; Xu, C; Kotov, NA; Liz-Marzán, LM. **Plasmonic Nanoparticles with Supramolecular Recognition.** *Adv. Funct. Mater.* 2020, 30, 1902082



Training



The SARS-COV-2 pandemic hindered some of the training activity. In particular, we could hardly host visiting students and researchers, our seminar program was completely stopped for months and then restarted in an online modality.

Yet, in 2020 there have been **66** active **PhD tesis**, **11** of them successfully completed during the year. Our researchers performed **16 secondments** at collaborating institutions, and we hosted **15 stays** of visiting researchers. The Center organized **18 seminars**, **5 workshops/conferences** and our researchers have participated as co-organizers of **6 international conferences**.

PhD Program

The objective of CIC biomaGUNE's PhD Program is to provide PhD students with top quality multidisciplinary training at the interface between biology, chemistry, nanobiotechnology and materials science. The students benefit from international training and are exposed to different research areas. The training program offers weekly lectures by leading scientists, technical training courses on a broad range of scientific techniques and instrumentation, opportunities for

short stays at renowned international research institutions, as well as complementary training in soft skills to prepare doctoral candidates to become highly qualified, autonomous and skilled professionals. The joint training of PhD candidates fosters closer ties and cooperation between research groups and researchers of the institutions involved.

CIC biomaGUNE has agreements with several universities (which are the degree-grating bodies) to enroll PhD students in different PhD programs.

Additionally, CIC biomaGUNE principal researchers are PhD Program Professors in the following Doctoral programs from the [University of the Basque Country \(UPV/EHU\)](#), CIC biomaGUNE participates in the following Doctoral programs.

- Synthetic & Industrial Chemistry
- Applied Chemistry & Polymeric Materials
- Molecular Biology & Biomedicine
- Medicine & Surgery
- Biomedical Research programs

Co-supervised PhD Scheme

Since 2016, CIC biomaGUNE is running a program of co-supervised (and co-funded) PhD theses, in collaboration with other research institutions, technology centers and enterprises in the Basque Country. In 2020, 25 PhD theses were co-directed with the following institutions:

- POLYMAT – Basque Center for Macromolecular Design & Engineering
- DIPC
- CIC bioGUNE
- CIC nanoGUNE
- IIS BioCruces
- IIS BIODONOSTIA
- TECNALIA
- GAIKER
- CIDETEC
- ACHUCARRO - Basque Center for Neuroscience
- UPV-EHU
- BIOFISIKA – Basque Center for Biophysics



PhD Theses

During 2020,
11 students
obtained their
PhD at
CIC biomaGUNE

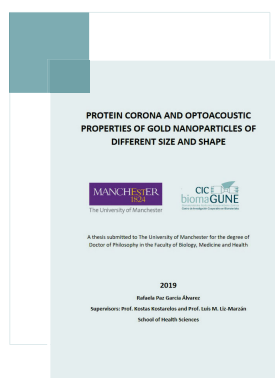


Daniel Sánchez de Alcazar

Engineered proteins as molecular templates for functional materials

Supervisor: *Aitziber L. Cortajarena*

Defense Date: 10/01/2020

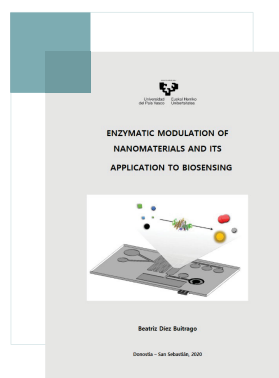


Rafaela Paz García Álvarez

Protein corona and optoacoustic properties of gold nanoparticles of different size and shape

Supervisor: *Prof. Luis M. Liz-Marzán & Prof. Kostas Kostarelos*

Defense Date: 14/02/2020

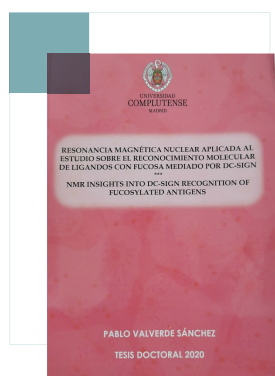


Beatriz Díez Buitrago

Enzymatic modulation of nanomaterials and its application to biosensing

Supervisor: *Dr. Valery Pavlov*

Defense Date: 07/04/2020

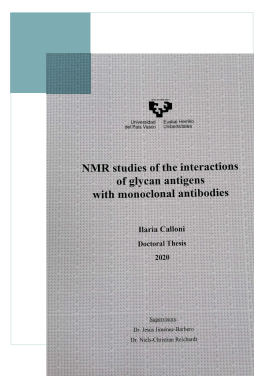


Pablo Valverde Sánchez

NMR Insights into DC-SIGN recognition of fucosylated antigens

Supervisor: *Dr. Niels C. Reichardt & Prof. Jesús Jiménez Barbero*

Defense Date: 27/04/2020

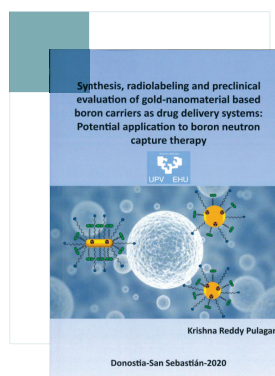


Ilaria Calloni

NMR studies of the interactions of glycan antigens with monoclonal antibodies

Supervisor: *Dr. Niels C. Reichardt & Prof. Jesús Jiménez Barbero*

Defense Date: 29/06/2020

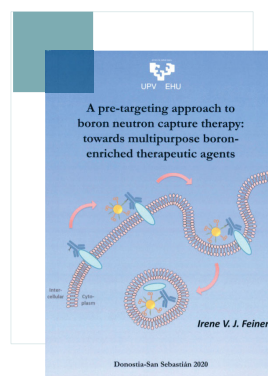


Krishna Reddy Pulagam

Synthesis, radiolabeling and preclinical evaluation of gold-nanomaterial based boron carriers as drug delivery systems: Potential application to boron neutron capture therapy

Supervisor: *Dr. Jordi Llop*

Defense Date: 01/07/2020

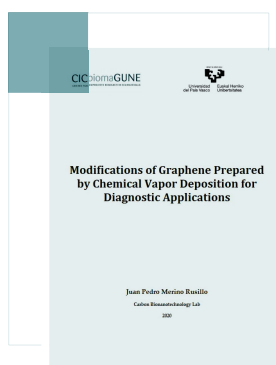


Irene V. J. Feiner

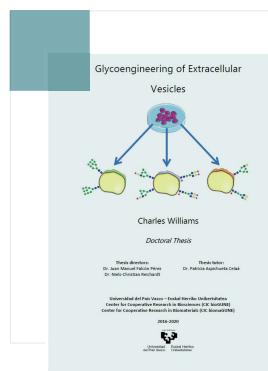
A pre-targeting approach to boron neutron capture therapy: towards multipurpose boron-enriched therapeutic agents

Supervisor: *Dr. Jordi Llop*

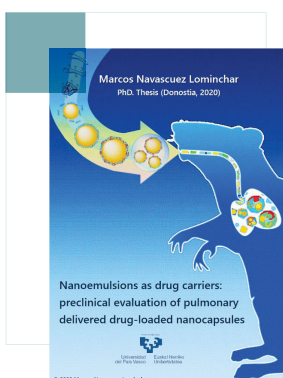
Defense Date: 06/07/2020



Juan Pedro Merino-Rusillo
 Modifications of Graphene Prepared by Chemical Vapor Deposition for Diagnostic Applications
 Supervisor: *Prof. Maurizio Prato & Dr. Alejandro Criado*
 Defense Date: 02/09/2020



Charles Williams
 Glycoengineered Exosomes as Vehicles for Gene and Drug Delivery
 Supervisor: *Dr. Niels C. Reichardt & Dr. Juan Falcón*
 Defense Date: 07/10/2020



Marcos Navascuez Lominchar
 Nanoemulsions as drug carriers: preclinical evaluation of pulmonary delivered drug-loaded nanocapsules
 Supervisor: *Dr. Jordi Llop & Dr. Iraida Loinaz*
 Defense Date: 30/10/2020



Marta Martínez Moro
 Biological Fate of Soft Nanomaterials: A Physico-Chemical and Translocation Study
 Supervisor: *Dr. Sergio Moya*
 Defense Date: 21/12/2020

Master & Vocational Training Programs

Master Students

CIC biomaGUNE has agreements with several universities (which are the degree-grating bodies) in different Master programs. Additionally, in partnership with the **University of the Basque Country (UPV/EHU)**, CIC biomaGUNE participates in the following MSc courses by providing lectures and direction of master thesis:

- Molecular Biology and Biomedicine
- Nanoscience
- Chemistry and Polymers

Vocational Training Programs

CIC biomaGUNE has agreements with **CPES CESA BHIP, Don Bosco and Colegio Inmakulada Ikastetxea**, Centers for Intermediate and Superior level vocational training in the fields of Chemistry or Biosciences to host training internships of students. Several training placements take place every year at different laboratories of the Center. Selected students are mentored and supervised by postdoctoral researchers or PhD students and receive hands-on training.

Research Secondments & Summer Internships

In the framework of different national and international projects, CIC biomaGUNE has established collaborations with international institutions to **second** and **host research stays of PhD students and postdoctoral researchers**. During 2020, our researchers performed **16 secondments** at collaborating partners and we hosted **15 stays** of visiting researchers.

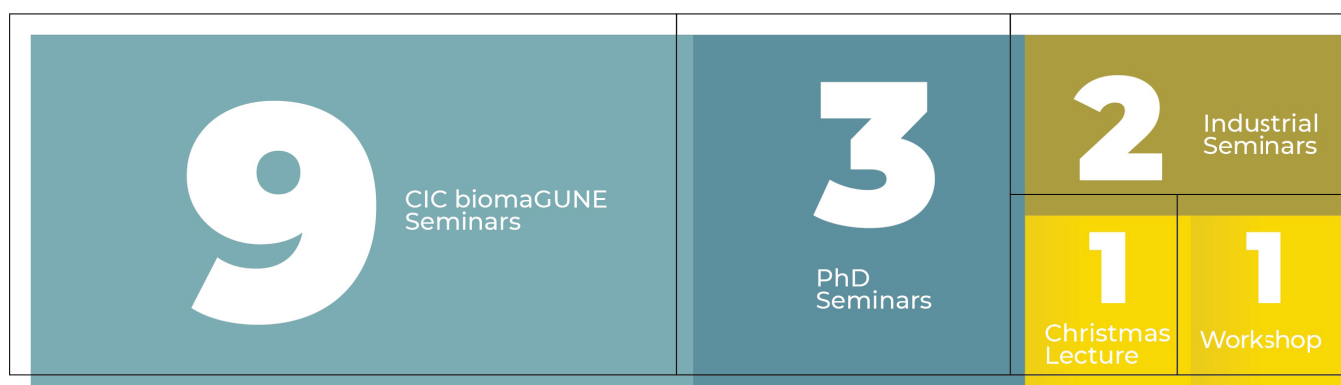
This activity was clearly hindered by the pandemic situation and the summer undergraduate program could not take place in 2020.

Research stays	2015	2016	2017	2018	2019	2020
From CIC biomaGUNE	30	30	19	11	23	16
To CIC biomaGUNE	59	105	92	84	98	15
<ul style="list-style-type: none"> ■ Visiting Professors/Sabbaticals 	1	4	1	2	2	
<ul style="list-style-type: none"> ■ Erasmus placements 	1	7	7	2	8	
<ul style="list-style-type: none"> ■ Summer placements 	2	5	6	6	15	
<ul style="list-style-type: none"> ■ Vocational training 	4	7	5	3	5	

Seminars

CIC biomaGUNE runs an annual program of scientific seminars, which includes:

- i) **International seminars** delivered by internationally recognized researchers of varying scientific backgrounds and fields.
- ii) **Postdoc seminars** delivered by selected postdoctoral fellows to share progress in each of our laboratories to the rest of the Center.
- iii) **PhD seminars** delivered by PhD students of the Center.
- iv) **Training seminars** delivered by CIC biomaGUNE's PIs or Platform Managers, aimed at strengthening the technical training program and soft skills training. Altogether, these programs contribute to the career development of our researchers. During 2020, **16 seminars** have been delivered most of them in an online modality after a long break caused by the pandemic situation.





- 09/01/2020
Neutralizing Dual-SMAD Inhibition Proteins as a Therapeutic Mechanism of Action
Dr. Neethan A. Lobo - Onena Medicines
- 30/01/2020
Aberrant activation of developmental programs in adult disease
Prof. Ángela Nieto - Instituto de Neurociencias (CSIC-UMH)
- 06/02/2020
Manufacturing of Recombinant Adeno-associated Viral Vector (rAAV) For Human Gene Therapy Treatments
Dr. César Trigueros - Viralgen
- 27/02/2020
Sperm-based microbots and their potential to improve ART success and reproductive health
Dr. Mariana Medina - Institute for Integrative Nanosciences
- 04/03/2020
Looking for targets to prevent non-alcoholic fatty liver disease progression
Prof. Patricia Aspichueta - UPV/EHU
- 23/09/2020
A pre-targeting approach to boron neutron capture therapy: towards multipurpose boron-enriched therapeutic agents
Dr. Irene Feiner - CIC biomaGUNE
- 30/09/2020
Modifications of Graphene Prepared by Chemical Vapor Deposition for Diagnostic Applications
Dr. Juan Pedro Merino - CIC biomaGUNE
- 14/10/2020
Conjugated polymers for neural stimulation and their application for vision restoration in retinal dystrophies
Prof. Fabio Benfenati - University of Genoa
- 21/10/2020
How to keep women (and men) in science
Prof. Dr. Petra Rudolf - Zernike Institute for Advanced Materials, University of Groningen
- 29/10/2020
CIC biomaGUNE 2nd PhD Day
 CIC biomaGUNE
- 04/11/2020
Nanotoxicology: does it matter how cells die?
Prof. Bengt Fadeel, M.D., Ph.D. - Institute of Environmental Medicine, Karolinska Institutet
- 11/11/2020
Inorganic-organic hybrid materials for biomedicine
Dr. Dorleta Jiménez de Aberasturi - CIC biomaGUNE
- 18/11/2020
Heterochiral Peptide Assembly: Entry to Wonderland through the Mirror
Dr. Silvia Marchesan - University of Trieste
- 02/12/2020
Glycoengineering of Extracellular Vesicles
Dr. Charles Williams - CIC biomaGUNE
- 09/12/2020
Functional nanomaterials from diatoms microalgae
Prof. Gianluca M. Farinola - Università degli Studi di Bari Aldo Moro
- 17/12/2020
Our Glycans: Tales of non-self, self and superself
Dr. Niels C. Reichardt - CIC biomaGUNE

Organization of Scientific Workshops/Conferences

CIC biomaGUNE seeks to enhance its national and international visibility and reputation by organizing conferences, workshops and seminars that share knowledge about the latest research and advances in the field of biomaterials. The following events have been organized during 2020:

Additionally, our researchers chaired or co-organized a number of international symposia:

4th Annual Meeting of Research in Pulmonary Hypertension

FEB 28

CIC biomaGUNE Organizer:
Jesús Ruiz-Cabello
Madrid

3rd Glycobasque Meeting

MAR 12-13

CIC biomaGUNE Organizer:
Niels C. Reichardt
Derio (Bizkaia)

2nd CIC biomaGUNE PhD Day

OCT 29

Organizer:
CIC biomaGUNE
San Sebastian

Interdisciplinary Consortia for the Study of Pandemics

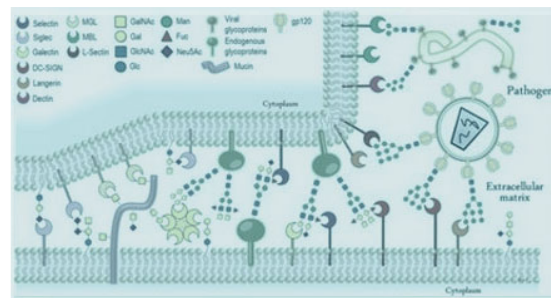
**OCT 2
NOV 13
DEC 10**

CIC biomaGUNE Organizer:
Ivan Coluzza
Online

2020 Christmas Lecture

DEC 17

Organizer:
CIC biomaGUNE
Online



Glycans or carbohydrates that cover the surface of all living cells have developed into a kind of species-specific molecular passport that help determine how our organisms recognize invading pathogens, cancer cells or recognize proteins and cells of the same organism. The weak but specific forces between single carbohydrates and proteins are reinforced through various levels of polyvalent presentation on the protein or cell level leading to interactions of high strength and specificity which can even outperform antibody-antigen binding. We will look at the role of glycans in cell-pathogen communication, assess their opportunities as functional biomarkers and fantasize on the potential of multivalent glycomimetics in immune therapy.

Symposia in the 259th ACS National Meeting

MAR
22-26

CIC biomaGUNE
Organizer:
Wolfgang Parak
Philadelphia (USA)

Series of meetings "COVID19@DIPC"

MAY 8
MAY 22
JUN 5

CIC biomaGUNE
Organizer:
Ivan Coluzza
Online

Symposia in the 260th ACS National Meeting

AUG
17-20

CIC biomaGUNE
Organizer:
Wolfgang Parak
San Francisco (USA)

MAR
7-14

CIC biomaGUNE
Organizer:
Maurizio Prato

International Winterschool on Electronic Properties of Novel Materials

ONE EVERY MONTH

CIC biomaGUNE
Organizer:
Fernando López-Gallego

Webinar series on Biocatalysis of the Thematic Network on Biocatalysis of the State Research Agency

JUL
8-9

CIC biomaGUNE
Organizer:
Maurizio Prato
Online

Conference on Chiral Plasmonics



Outreach



One of the strategic objectives of CIC biomaGUNE is the communication and dissemination of knowledge within and beyond the academic community. In 2020, despite the pandemic situation, our commitment toward outreach, promotion of STEAM careers in young girls and visibility of women in science has continued, as clearly reflected in the list of conducted activities:

International Day of Women & Girls in Science



The Basque Technology Park Network joins the campaign 'Women and Girls in science' on the occasion of the celebration on February 11 of the "International Day of Women and Girls in science". This campaign aims to make visible the female talent working in companies and centers of the Technology Parks of Araba, Bizkaia and Gipuzkoa. For this campaign, they have counted with the participation of:

Susana Carregal-Romero, Research Associate, researches on the pulmonary administration of nanomedicines and the effect of their physicochemical properties on their fate and efficiency.

Dina Niculaes, Postdoctoral Researcher in the Biomolecular Nanotechnology group, investigating the feasibility of a test for antibody detection based on fluorescent metallic nanoclusters stabilized by designer proteins.

Clara García-Astrain, Postdoctoral Researcher in the BioNanoPlasmonics group, investigates the development of new 3D nanocomposite materials for tumor growth monitoring.

Irantzu Llarena, Head of the Optical Microscopy Platform, which involves teaching, technical work and research in the characterization of biomaterial and biological systems.

Emakumeak Zientzian



The research centres CIC nanoGUNE, the Materials Physics Centre (CFM CSIC-UPV/EHU), CIC biomaGUNE, the Donostia International Physics Center (DIPC), Biodonostia, Tecnun-School of Engineering, Ceit, POLYMAT and Elhuyar have come together to present a joint programme to mark the International Day of Women and Girls in Science to be held internationally on 11 February across the world. In Donostia-San Sebastian, the Emakumeak Zientzian 2020 programme took place from 7 to 14 February with workshops, public talks, competitions, visits, etc. The initiative aims to make the activity of women in science visible, to break down typically male roles attributed to scientific and technical activities, and to encourage girls and teenagers to opt for careers in science. Emakumeak Zientzian 2020 is being supported by the Chartered Provincial Council of Gipuzkoa, Fomento San Sebastián, Donostia Kultura, the University of the Basque Country (UPV/EHU) and the National Research Council (CSIC).

The image of yesterday, today, tomorrow



Jordi Llop

Opinion piece for El Correo.



Inspira 2020



The INSPIRA project is a pioneering project in Euskadi for the promotion of the scientific-technological vocation (STEAM: Science, Technology, Engineering, Arts and Maths) among girls.

The mentors accompany students during a period of two months with the following aim:

- Provide new references of nearby women technologists
- For boys and girls to discover the STEAM professions
- Raise awareness of the need for the development of the country to occur between men and women
- Sensitize and guide on the career in technology
- Make visible and value women technologists

The mentors from CIC biomaGUNE for 2020 have been *Elisa Bindini*, *Vanessa Gómez-Vallejo*, *Clara García-Astrain* and *Angie Ramírez*.



Instagram Live Talk between Aitziber L. Cortajarena & Boticaría García



Instagram Live Talk between *Aitziber L. Cortajarena* and *Marián García (Boticaría García)*, who has a PhD in Pharmacy and has a popular outreach handle on Instagram where she talks about different topics.

They discussed about the response of the scientific community to the Covid-19.



Encounter of scientific lives 2020



CIC biomaGUNE will participate in the next 10th "Encuentro de Vidas Científicas 2020" organized by Eureka! Zientzia Museoa, located in the Parke of Gipuzkoa. This activity, took place on October 19 and November 2, and it is directed to 4^o ESO and bachelorship students with the aim of boosting scientific vocations. The aim is to create a space where students can speak, ask questions and exchange opinions directly with various professionals from different scientific and technological fields. Thus, students who have in mind to study science-related studies will be able to find out about future employment opportunities, ask questions about what it means to take certain studies, detect possible difficulties to be encountered, etc.



Jordi Llop interview in Hablando con Científicos



Jordi Llop, Head of the Radiochemistry and Nuclear Imaging group at CICbiomaGUNE, explains how non-invasive nuclear imaging techniques help in the diagnosis of diseases in the podcast "Hablando con Científicos".



OCT
5

Pedro Ramos-Cabrer interview in La Mecánica del Caracol



Pedro Ramos-Cabrer, Principal Investigator of the MRI group at CIC biomaGUNE, interviewed by Eva Caballero in "La Mecánica del Caracol" to talk about his work on reconnecting neurons from spinal cord injuries *in vivo*.

The results of this study by Ikerbasque Professor Pedro Ramos-Cabrer and Ikerbasque Professor and Axa Chair Maurizio Prato, both researchers at CIC biomaGUNE, have been published in the prestigious journal PNAS (Proceedings of the National Academy of Sciences of the U.S.A.) and open a way for a potential recovery of spinal cord injuries.



OCT
8

Rosalind Franklin, honoured at the Donostia WeekINN



As part of the WeekINN week organised by FOMENTO DSS, and within the framework of the event "Women scientists of yesterday and today", *Clara García-Astrain*, postdoctoral researcher in the BioNanoPlasmonics group, delivered a presentation about the life and the important role that Rosalind Franklin played in understanding the structure of DNA.



OCT
28

II Aseica Joven Video Competition



Peio Azcoaga, pre-doctoral researcher in the Molecular and Functional Biomarkers group at CIC biomaGUNE and the breast cancer group at IIS Biodonostia, talks about oncostatin and breast cancer in his video for the "II Aseica Joven Video Competition".



Aitziber L. Cortajarena, interview on La Mecánica del Caracol on Radio Euskadi



Journalist Eva Caballero interviews CIC biomaGUNE Ikerbasque professor *Aitziber L. Cortajarena* about the e-Prot project that she coordinates and which has received a grant from the European Commission in the latest FET Open call. The researcher talks about the project, which aims to develop bioinspired, sustainable and efficient bioelectronic systems based on proteins as an alternative to the traditional technologies used in the electronics industry.



Niels C. Reichardt, interview in Cadena Ser



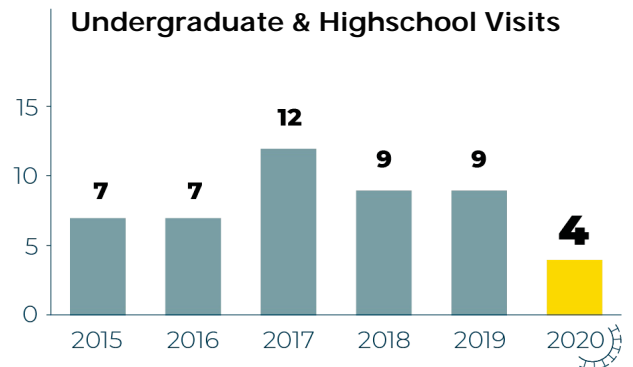
CIC biomaGUNE researcher *Niels C. Reichardt*, leader of the Glycotechnology Laboratory, interviewed by Aloña Velasco on Cadena SER's A vivir Euskadi programme. They talked about the research on COVID-19; Specifically, the project coordinated by Niels C. Reichardt, in which Neiker, Biodonostia, Asparia Glycomics and Vicomtech also participate, which aims to develop antibody and antigen microarrays as a platform for the diagnosis and epidemiological study of the virus, and which has received a grant from the Provincial Council of Gipuzkoa.



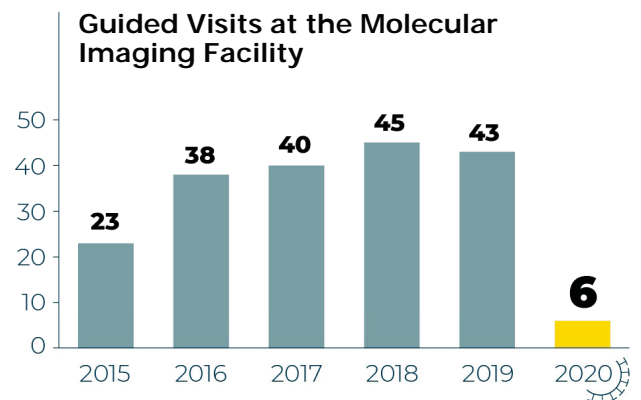
Open Days & Visits

CIC biomaGUNE regularly receives visits from high-school and university students who come to have a closer look at our activity. These visits typically include a lecture about biomaterials in the context of life sciences, an open discussion with CIC biomaGUNE researchers, and a guided tour to six technical facilities/laboratories (Nanoparticle synthesis platform, Confocal Microscopy, Radiochemistry platform, Molecular Imaging Facility, Scanning Electron Microscopy, Atomic Force Microscopy). The program of visits is run by *Ana Sánchez-Iglesias, Marco Möller, Daniel Padró, Irantzu Llarena* and *Vanessa Gómez-Vallejo* with the support from other Platform Managers as well as PhDs, Postdocs and Principal Investigators. Unfortunately, this activity was severely hindered by the pandemic situation.

Undergraduate & Highschool Visits

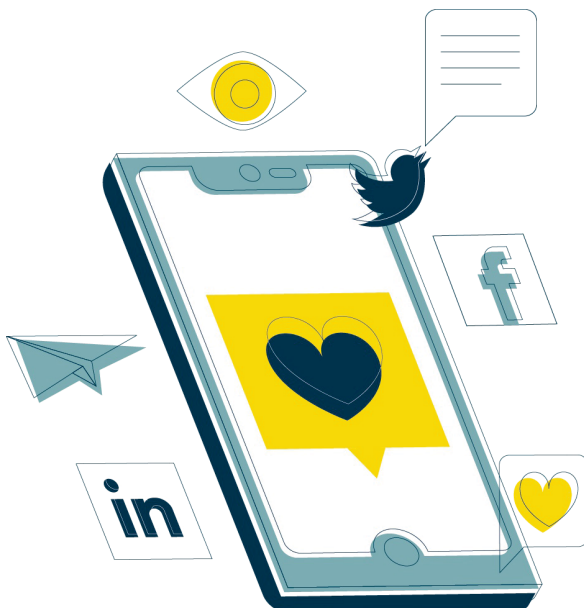


Guided Visits at the Molecular Imaging Facility



Media

CIC biomaGUNE is committed to disseminating research results and other news, not only to the scientific community but also to the general public. Our presence at social media has remained with an increase of the number of followers/connections.



	2019	2020	
Impacts in General Media	207	478	+271
Web Visits	36,715	60,447	+23,732
Twitter Followers	1827	2047	+220
Linkedin	1755	2643	+888
Facebook Likes	151	184	+33
Facebook Followers	165	208	+43

Supported by:



Credits:

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Susana Carregal-Romero,
CIBERES researcher at the
Molecular and Functional
Biomarkers group

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Anna Llanes-Pallàs
Naiara Laespada
Luis M. Liz-Marzán

CICbiomaGUNE

MEMBER OF BASQUE RESEARCH
& TECHNOLOGY ALLIANCE



EXCELENCIA
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DE MAEZTU
07/2018 - 06/2022



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CIC biomaGUNE



@CIC biomaGUNE



www.cicbiomagune.es



+34 943 00 53 00



info@cicbiomagune.es

Gipuzkoa Science & Technology Park
Paseo Miramón 194
20014 Donostia - San Sebastián
Gipuzkoa SPAIN