

# Scientific and Economic Report 2019



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# **DIRECTOR'S FOREWORD**

It is a great pleasure for the board of directors and the scientific and management team of the Biomedical Research Institute of Murcia (IMIB) to present the 2019 Scientific Report. In 2019, the researchers and personnel of the IMIB, have achieved the objectives of excellence for the quality of the Institute scientific development. Secondly, we have started to develop the strategic axis of innovation and transfer of the Institute's results, and finally, we have successfully obtained the reaccreditation of the IMIB by an audit of the National Institute of Health Carlos III (ISCIII). The audit took place between July and December, following the highly demanding criteria of the new Technical Accreditation Guide for Health Research Institutes (IIS).

We are witnessing a leap in the scientific quality of the IMIB. It is worth mentioning that, even with a smaller number of scientific publications than the previous year, the impact factor has increased by 500 points ( $> 3,000$ ), and what is more important, the percentage of publications in first decile journals has almost doubled. IMIB's leadership in scientific production has increased significantly, and the Institute's Crown Index is now close to three.

Furthermore, I would like to highlight, the extraordinary work and the efficiency of the IMIB's managing Foundation (FFIS) personnel in managing projects, clinical trials and human resources of the Institute. The effort of the Scientific Committee, IMIB management department, governing Council and Permanent and Advisory Committees have been essential for the increased in scientific quality. The joint and coordinated effort of everyone has been crucial to pass the ISCIII reaccreditation audit. In particular, the excellent work of the new Quality, Communication, Training and Innovation Committees, as well as the Bioinformatics Core Facility, which developed a unique computer tool for the comprehensive data presentation of the Institute's quality indicators. As an example, almost one and a half million euros were raised for the Institute in competitive HR calls (17 positions), and 16 structural positions were consolidated. This year, we have also taken the first steps in innovation and transfer, adding to the four existing patents, one utility model, a corporate spin-off, the implementation of four Clinical Practice Guidelines and the preparation of five new patents. Furthermore, we have held meetings with the research groups to offer companies a wide service portfolio. Highlighting the Agreement signed



**DR. PABLO RAMÍREZ ROMERO**  
**SCIENTIFIC DIRECTOR OF THE IMIB-ARRIXACA**

with the *Instituto de Fomento empresarial de la Región de Murcia* (INFO). The auditors suggested the IMIB to share our excellent computer tool so that other Institutes in the ISCIII network can use it.

For 2020, and within the framework of the IMIB Strategic Research Plan for the period 2019-2023, already evaluated by the ISCIII, we have promoted innovation, transfer and clinical trials in early stages. In addition, we have prioritized the following actions: 1. Bring the management department (The Foundation for Health Research and Training of Murcia- FFIS) closer to basic and clinical researchers, relocating them to the Bioscience Campus and developing an Internal Communication plan; 2. Work towards an integrated management system of the University of Murcia (UMU), Murcia Health Service (SMS) and the FFIS-IMIB, implementing an indirect cost policy, recommended by the ISCIII, that returns to the IMIB and allows the fulfilment of its own research plan, including intramural calls for HR and strategic projects (COVID-19, emerging groups, Primary Care, Nursing, groups of excellence, etc.); 3. Reorganization of the Scientific Areas, adapting them to the reality of the IMIB groups, and in alignment with the IMIB, regional, national and European strategies; and finally, 4. The integration of patients and members of the public into different committees, considering their opinion (participation in project evaluation panels, participation in intramural call strategies, etc.) and even, promoting their participation in government bodies of the Institute.

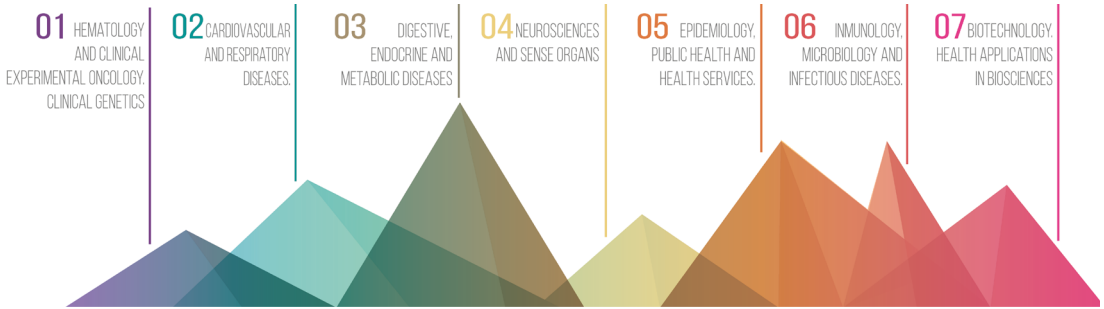
Finally, I would like to emphasize the unconditional support of the maximum authorities of the Ministry of Health, the UMU, SMS, Council of Employment, Research and Universities and the FFIS, in an atmosphere of harmony and coordination, with a strong commitment to make our Institute one of the best at national and European level. The Scientific and Management Directorate of the IMIB, appreciate the involvement and work throughout 2019 of the General Directorate for Planning, Training, Research, Pharmacy and Citizen Services, the Management of the *Virgen Arrixaca* Clinical University Hospital (HCUVA), as well as the Vice-Chancellors for Research and Transfer, as well as Biosciences (UMU), during the board of directors and Permanent Committees meetings.

Pablo Ramírez Romero  
Scientific Director of the IMIB-Arrixaca



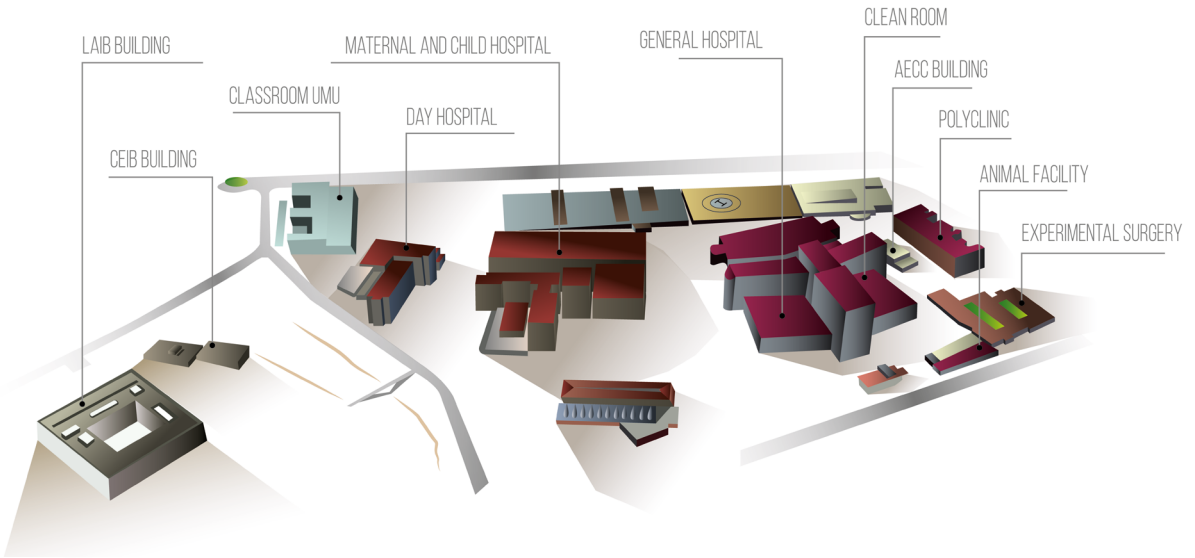
# THE INSTITUTE

The IMIB is the Murcia BioHealth Research Institute-Hospital. The institute is mainly located in the Virgen de la Arrixaca University Clinical Hospital, in the Health Sciences Campus of the UMU. The research activity of the institute is organized in seven areas:



IMIB research areas

Furthermore, the IMIB integrates different cross-cutting services to support biomedical research, provided by the two associated institutions: SMS and the UMU.



Scale model of the IMIB complex (Including the Biosciences Campus and the HCUVA)

The main centres of the IMIB are located in the Virgen de la Arrixaca University Clinical Hospital and in the Health Sciences Campus of the University of Murcia. They are separated by 300 square meters and this creates an excellent niche to promote biomedical research in the Region. Both centres are gathering the critical mass of researchers at the IMIB.



HCUVA



# **ORGANIZATIONAL STRUCTURE**



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*Lay Independent Member*

**D.ª Gema Chicano Saura**



# RESOURCES

## ANNUAL OBJECTIVES AND DEGREE OF IMPLEMENTATION ACHIEVED.

As a main goal, the scientific areas of the IMIB aim to obtain research resources to train a new generation of scientists and to attract scientific excellence improving research production and transfer of knowledge.

To achieve this goal, areas 1, 2, 3, 5 and 6 pretend to obtain competitive funding from regional and national programs. During 2019, the research department, in collaboration with human resources, has processed 67 applications for personnel. Overall, 116 applications have been, both from research projects and from HR, obtaining a total of 56 fellowships. Therefore, the success rate stands at around 48.3% considering that, as of 31/12/2019, the MICINN HR result has not been published.

| CALLS                         | APPLICATIONS |   |   |   |   |   |   | FEMALE                                 | MALE |    |
|-------------------------------|--------------|---|---|---|---|---|---|--|------|----|
|                               | AREAS        |   |   |   |   |   |   |  |      |    |
|                               | 1            | 2 | 3 | 4 | 5 | 6 | 7 | NO IMIB                                |      |    |
| MICINN-PROYECTOS              | 1            | 1 | 3 | 0 | 0 | 1 | 0 | 2                                      | 0    | 8  |
|                               | 8            |   |   |   |   |   |   |  |      |    |
| MICINN-RRHH                   | 3            | 2 | 1 | 0 | 0 | 0 | 0 | CORE FACILITIES: 3                     | 5    | 4  |
|                               | 9            |   |   |   |   |   |   |  |      |    |
| ISCIII-PROYECTOS              | 2            | 5 | 6 | 1 | 1 | 3 | 2 | 3                                      | 7    | 16 |
|                               | 23           |   |   |   |   |   |   |  |      |    |
| ISCIII-RRHH                   | 8            | 9 | 6 | 0 | 1 | 4 | 0 | 1 RIO HORTEGA<br>2 RESEARCH MANAGEMENT | 18   | 13 |
|                               | 31           |   |   |   |   |   |   |  |      |    |
| SENECA FOUNDATION<br>PROJECTS | 1            | 0 | 3 | 0 | 0 | 1 | 0 | 1                                      | 1    | 12 |
| SENECA FOUNDATION HR          | 1            | 0 | 4 | 0 | 0 | 2 | 0 |  |      |    |
|                               | 13           |   |   |   |   |   |   |  |      |    |
| PRIVATE                       | 3            | 1 | 2 | 0 | 0 | 4 | 0 | 2                                      | 3    | 9  |
|                               | 12           |   |   |   |   |   |   |  |      |    |
| INTRAMURAL AP-CE              | 0            | 0 | 3 | 3 | 0 | 2 | 0 | 12                                     | 16   | 4  |
|                               | 20           |   |   |   |   |   |   |  |      |    |

| CALLS                      | AWARDED   |   |   |   |   |   |   | FEMALE                | MALE      |           |
|----------------------------|-----------|---|---|---|---|---|---|-----------------------|-----------|-----------|
|                            | AREAS     |   |   |   |   |   |   |                       |           |           |
|                            | 1         | 2 | 3 | 4 | 5 | 6 | 7 | NO IMIB               |           |           |
| MICINN-PROYECTOS           | 0         | 1 | 2 | 0 | 0 | 0 | 0 | 0                     | 0         | 2         |
|                            | 3*        |   |   |   |   |   |   |                       |           |           |
| MICINN-RRHH                | 0         | 0 | 0 | 0 | 0 | 0 | 0 | 0                     | 0         | 0         |
|                            | 0         |   |   |   |   |   |   |                       |           |           |
| ISCIII-PROYECTOS           | 1         | 3 | 2 | 1 | 0 | 1 | 0 | 1                     | 4         | 5         |
|                            | 9         |   |   |   |   |   |   |                       |           |           |
| ISCIII-RRHH                | 4         | 5 | 3 | 0 | 1 | 2 | 0 | 1 RESEARCH MANAGEMENT | 8         | 7         |
|                            | 16*       |   |   |   |   |   |   |                       |           |           |
| SENECA FOUNDATION PROJECTS | 0         | 0 | 2 | 0 | 0 | 0 | 0 | 1                     | 0         | 6         |
| SENECA FOUNDATION HR       | 1         | 0 | 2 | 0 | 0 | 0 | 0 |                       |           |           |
|                            | 6         |   |   |   |   |   |   |                       |           |           |
| PRIVATE                    | 2         | 0 | 1 | 0 | 0 | 1 | 0 |                       | 1         | 3         |
|                            | 4         |   |   |   |   |   |   |                       |           |           |
| INTRAMURAL AP-CE**         | 0         | 3 | 3 | 0 | 2 | 0 | 0 | 10                    | 16        | 2         |
|                            | 18        |   |   |   |   |   |   |                       |           |           |
| <b>TOTAL</b>               | <b>56</b> |   |   |   |   |   |   |                       | <b>29</b> | <b>25</b> |

\*Ramón y Cajal (candidates are not known yet).

\*\* Atención Primaria-Cuidados de Enfermería (AP-CE).

Furthermore, the completion of projects and the implementation of new clinical trials have allowed groups in the different areas to hire personnel to increase the research activity of the IMIB. Here we list in detail:

Area 1: One postdoctoral researcher, one Predoctoral researcher and one technician.

Area 2: One postdoctoral researcher, one Predoctoral researcher and six technicians.

Area 3: Six technicians.

Area 4: Three Predoctoral researchers and one technician.

Area 5: One Predoctoral researcher and one technician.

Area 6: Three Predoctoral researchers and three technicians.

Area 7: Two postdoctoral and two predoctoral researchers.

In 2019, the number of research staff fully or partially funded through competitive calls and research networks was 30.63.

### RESEARCH STAFF: ANNUAL CAREER PROGRESSION

The researchers of the institute classified according European Euraxess criteria are shown in the following table, organized both by area and in by Institute's overall calculation.

| AREA         | OTHERS | R1  | R2  | R3 | R4 | TOTAL |
|--------------|--------|-----|-----|----|----|-------|
| AREA 1       | 21     | 20  | 79  | 15 | 11 | 146   |
| AREA 2       | 24     | 11  | 96  | 10 | 5  | 146   |
| AREA 3       | 15     | 23  | 127 | 12 | 10 | 187   |
| AREA 4       | 10     | 14  | 69  | 4  | 7  | 104   |
| AREA 5       | 4      | 5   | 107 | 4  | 0  | 120   |
| AREA 6       | 18     | 13  | 92  | 8  | 3  | 134   |
| AREA 7       | 4      | 29  | 91  | 6  | 10 | 140   |
| <b>TOTAL</b> | 96     | 115 | 661 | 59 | 46 | 977   |

\* Other: Research support technicians (laboratory technicians, clerical staff, etc.)

Of the 977 researchers constituting the IMIB in 2019, women represent 49.8% and men 50.3%. Of the 105 researchers classified as principal investigators (R3 and R4 according to the Euraxess classification) a total of 35.2% are women and 64.8% men.

### ADMINISTRATION AND MANAGEMENT STAFF

The administration and management staff count with the equivalent of 26 professionals dedicated to the management of the Institute. The IMIB Management body follows the recommendations of the Health Council (CS) for gender parity employing a total of 68% women and 32% men.



Management and administration personnel

It is worth highlighting some aspects of the administration and research departments. The IMIB Human Resources Department acts as adviser for management body and it is responsible for the full management of the Institute's personnel. The department also executes the human resources policy approved by the Board of Trustees, contributing with their knowledge regarding the current regulation.

The tasks performed by the staff can be grouped into the following blocks:

- › Administrative management of funding proposals for hiring personnel in close collaboration with the research group.
- › Personnel management. Including all the administrative and legal procedures for hiring personnel from the beginning of the process until their termination.
- › Management of subsidized training for workers.
- › Management of curricular and extracurricular internships, as well as research exchanges.
- › Fill in data for statistics.
- › Health and safety (H&S) management. In collaboration with the prevention unit, the department is in charge of managing the administrative documentation related to the H&S.
- › Management of applications and communication with the General Directorate of Civil

Service regarding personnel.

- › Dialogue and negotiation with the *Comité de empresa* on behalf of the institute.
- › Leadership of the equality commission.
- › Implementation of the IT tool developed by the IT department to register working hours.
- › Creation, leadership and coordination of the Committee to prepare the equality plan.
- › Negotiations and drafting of agreements with the *Comité de empresa* regarding the working conditions of the staff. Set-up dialogue in order to initiate procedures for the drafting of the institute collective labour agreement.
- › Union elections for the constitution of a new *Comité de empresa*.
- › NNew system for processing compatibility. The HR department advises, prepares and processes the request to the competent body on behalf of the worker, and follow-up.
- › Management of authorization by the Civil Service department for all employment contracts linked to research projects saving time.
- › Management of an employee replacement rate by obtaining two replacement positions in order to increase the stable positions of the institute.
- › Stabilization of the positions of Central Core Facility managers.



# ECONOMIC DATA



## INCOME

Funds of competitive and non-competitive origin are detailed below. In addition, the use of indirect costs according to origin is also detailed.

| TOTAL INCOME           |                     |                     |                     |                   |                     |       |
|------------------------|---------------------|---------------------|---------------------|-------------------|---------------------|-------|
|                        | PRIVATE             | REGIONAL PUBLIC     | NATIONAL PUBLIC     | EUROPEAN PUBLIC   | TOTAL               | %     |
| <b>COMPETITIVE</b>     | 974.862,07          | 68.243,31           | 2.205.087,00        | 332.283,08        | 3.580.475,46        | 48,47 |
| <b>NON-COMPETITIVE</b> | 798.774,82          | 3.007.194,16        |                     |                   | 3.805.968,98        | 51,53 |
| <b>TOTAL</b>           | <b>1.773.636,89</b> | <b>3.075.437,47</b> | <b>2.205.087,00</b> | <b>332.283,08</b> | <b>7.386.444,44</b> |       |
| %                      | 24,01               | 41,64               | 29,84               | 4,50              |                     |       |
| INCOME INDIRECT COSTS  |                     |                     |                     |                   |                     |       |
|                        | PRIVATE             | REGIONAL PUBLIC     | NATIONAL PUBLIC     | EUROPEAN PUBLIC   | TOTAL               | %     |
| <b>COMPETITIVE</b>     | 54.744,95           | 3.618,55            | 149.540,82          | 1.300,57          | 209.204,90          | 2,83  |
| <b>NON-COMPETITIVE</b> | 60.743,89           | 4.846,99            |                     |                   | 65.590,88           | 0,89  |
| <b>TOTAL</b>           | <b>115.488,84</b>   | <b>8.465,54</b>     | <b>149.540,82</b>   | <b>1.300,57</b>   | <b>274.795,78</b>   |       |
| %                      | 1,56                | 0,11                | 2,02                | 0,02              |                     |       |

| INCOME INDIRECT COSTS / OVER TOTAL DIRECT INCOME |         |                 |                 |                 |
|--|---------|-----------------|-----------------|-----------------|
|  | PRIVATE | REGIONAL PUBLIC | NATIONAL PUBLIC | EUROPEAN PUBLIC |
| <b>COMPETITIVE</b>                               | 5,62%   | 5,30%           | 6,78%           | 0,39%           |
| <b>NON-COMPETITIVE</b>                           | 7,60%   | 0,16%           |                 |                 |

## EXPENSES

The expenses executed, audited and those approved by the Board are detailed below. In addition, the use of the indirect costs is explained.

| EXPENSES EXECUTED      |                     |                     |                     |                   |                     |       |
|------------------------|---------------------|---------------------|---------------------|-------------------|---------------------|-------|
|                        | PRIVATE             | REGIONAL PUBLIC     | NATIONAL PUBLIC     | EUROPEAN PUBLIC   | TOTAL               | %     |
| <b>COMPETITIVE</b>     | 964.872,91          | 64.624,76           | 2.074.631,50        | 330.982,51        | 3.435.111,68        | 46,51 |
| <b>NON-COMPETITIVE</b> | 7.38.030,93         | 3.213.301,83        |                     |                   | 3.951.332,76        | 53,49 |
| <b>TOTAL</b>           | <b>1.702.903,84</b> | <b>3.277.962,59</b> | <b>2.074.631,50</b> | <b>330.982,51</b> | <b>7.386.444,44</b> |       |
| %                      | 23,05               | 44,38               | 28,09               | 4,48              |                     |       |

| USAGE OF INDIRECTS COSTS |   |                   |
|--------------------------|---|-------------------|
| CENTRAL CORE FACILITIES  | Fungible goods  | 31.385,50         |
|                          | Training  | 2.881,04          |
|                          | Maintenance   | 108.639,39        |
|                          | Others  | 2.183,29          |
| MISCELLANEOUS IMIB       | Training  | 14.116,73         |
|                          | Science week  | 3.970,25          |
|                          | Annual Report   | 11.845,60         |
|                          | Communication plan  | 24.468,20         |
|                          | Strategic plan  | 15.000,00         |
|                          | Merchandising   | 3.329,92          |
|                          | Others Management (transfer, etc)   | 15.892,18         |
| OTHERS STRUCTURAL COST   | IMIB Infraestructure equipment  | 3.269,12          |
|                          | Personal expenses, research and clinical trials contracts                   | 41.486,67         |
|                          | Cofinancing of the RETOS state program R&D+i (Debt convertible into grants) | 18.746,54         |
| <b>TOTAL</b>             |   | <b>297.241,43</b> |

## BALANCE SHEET (ASSETS, LIABILITIES)

Investments made in 2019 can be classified into:

| MANAGEMENT STRUCTURE                |                   |
|-------------------------------------|-------------------|
| Classification                      | AMOUNT            |
| Transfer of facilities usage        | 12.320,00         |
| Computers and IT Material           | 2.420,23          |
| Office furniture                    | 107,44            |
| <b>TOTAL</b>                        | <b>14.847,67</b>  |
| PLATAFORMAS                         |                   |
| Classification                      | AMOUNT            |
| Computers and digital equipment     | 2.233,64          |
| Laboratory facilities and equipment | 51.565,55         |
| Furniture projects                  | 10.040,55         |
| <b>TOTAL</b>                        | <b>63.930,74</b>  |
| PROYECTOS                           |                   |
| Classification                      | AMOUNT            |
| Computers and IT Material           | 3.011,94          |
| Laboratory facilities and equipment | 120.397,84        |
| <b>TOTAL</b>                        | <b>123.409,78</b> |



# RESEARCH ACTIVITY

# COOPERATIVE RESEARCH NETWORKS OR CONSORTIUMS

## CIBERS

### CIBERCV – CARDIOVASCULAR DISEASES

**PI.** Francisco Marín Ortuño  
**Ref.** CB16/11/00385  
**Group.** Clinical and experimental cardiology  
**Area 2.** Cardiovascular and respiratory diseases

### CIBEREHD – LIVER AND DIGESTIVE DISEASES

**PI.** Alfredo Minguela Puras  
**Ref.** GCV12/EHD/2  
**Group.** Immunology and immunotolerance in transplants and immune-based diseases  
**Area 6.** Immunology, microbiology and infectious diseases

### CIBERER – RARE DISEASES

**PI.** Vicente Vicente García  
**Ref.** CB15/00055  
**Group.** Hematology and clinical-experimental medical oncology  
**Area 1.** Hematology and clinical-experimental oncology. Clinical genetics

**PI.** Encarna Guillén Navarro  
**Ref.** GCV14/ER/1  
**Group.** Research in Pediatrics  
**Area 2.** Cardiovascular diseases and respiratory

### CIBERESP – EPIDEMIOLOGY AND PUBLIC HEALTH

**PI.** M<sup>a</sup> Dolores Chirlaque López  
**Ref.** CB06/02/0042  
**Group.** Research in Epidemiology and Public Health  
**Area 5.** Epidemiology, Public Health and Services Health

# RETICS AND CENTRAL CORE FACILITIES

## NETWORKS

### ARADYAL – ASTHMA, ADVERSE AND ALLERGIC REACTIONS

**PI.** Luis García-Marcos Álvarez  
**Ref.** RD16/0006/0016  
**Group.** Research in Pediatrics  
**Area 2.** Cardiovascular and Respiratory Diseases

### RIS – AIDS RESEARCH

**PI.** Enrique Bernal Morell  
**Ref.** RD16/0025/0035  
**Group.** Immunology and immunotolerance in transplants and immune-based diseases  
**Area 6.** Immunology, microbiology and infectious diseases

### RICET – COLLABORATIVE RESEARCH IN TROPICAL DISEASES

**PI.** Manuel Segovia Hernández  
**Ref.** RD16/0027/0016  
**Group.** Clinical microbiology and tropical medicine  
**Area 6.** Immunology, microbiology and infectious diseases

## CENTRAL CORE FACILITIES

### SCREN – CLINICAL RESEARCH UNITS AND CLINICAL TRIALS

**Manager.** Jesús Ángel Sánchez Pérez  
**Ref.** PT17/0017/0008  
**SCREN center.** IMIB

### BIOBANK CENTRAL CORE FACILITY

**Manager.** Luis García-Marcos Álvarez  
**Ref.** PT17/0015/0038  
**SCREN center.** IMIB

# NETWORKS / EUROPEAN PHD PROGRAMS

## COST ACTION

### ION CHANNELS AND IMMUNE RESPONSE TOWARD A GLOBAL UNDERSTANDING OF IMMUNE CELL PHYSIOLOGY AND FOR NEW THERAPEUTIC APPROACHES (IONCHAN-IMMUNRESPON)

**PI.** Pablo Pelegrín Vivancos (Action Vice Chair)

**Ref.** BM1406

**Group.** Gastrointestinal, endocrine surgery and transplantation of abdominal organs

**Area 3.** Digestive, metabolic and endocrine diseases

**Date star/end.** 01-06-2015 / 30-06-2019

### INTERNATIONAL NETWORK FOR TRANSLATING RESEARCH ON PERINATAL DERIVATIVES INTO THERAPEUTIC APPROACHES

**PI.** Ángel Esteban Gil (Bioinformatics Central Core Facility);

Francisco José Nicolás Villaescusa (Area 6); Marta Agudo Barriuso (Area 4)

**Ref.** CA17116

**Participación.** WG3 Clinical Application

**Date star/end.** 01/10/2018 / 30-06-2019

### ENHANCING PSYCHIATRIC GENETIC COUNSELLING, TESTING, AND TRAINING IN EUROPE

**PI.** Juan Ramón Ordoñana Martín

**Ref.** CA17130

**Group.** Psychobiology and neurobiology of behavior

**Area 4.** Neurosciences and sense organs

**Date star/end.** 17-09-2018 / 16-09-2022

### DELIVERY OF ANTISENSE RNA THERAPEUTICS

**PI.** María Sabater Molina

**Ref.** CA17103

**Group.** Clinical and experimental cardiology

**Area 2.** Cardiovascular and respiratory diseases

**Date star/end.** 17-09-2018 / 16-09-2022

## EUROPEAN NETWORK TO ADVANCE CAROTENOID RESEARCH AND APPLICATIONS IN AGRO-FOODS AND HEALTH. EROCAROTEN

**PI.** M<sup>a</sup> Jesús Periago Caston

**Ref.** CA15136

**Group.** Nutrition and food science

**Area 3.** Digestive, metabolic and endocrine diseases

**Date star/end.** 30-10-2015 / 17-04-2020

## EUROPEAN RAPTOR BIOMONITORING FACILITY

**PI.** Emma Martínez López; Pilar Gómez Ramírez;  
Antonio Juan García Fernández; Silvia Espín Luján

**Ref.** CA16224

**Group.** Toxicology and risk evaluation

**Area 3.** Digestive, metabolic and endocrine diseases

**Date star/end.** 17-10-2017 / 16-10-2021

## EU ITNs

### EUROPEAN JOINT DOCTORATE IN BIOLOGY AND TECHNOLOGY OF REPRODUCTIVE HEALTH. MARIE SKLODOWSKA-CURIE INNOVATIVE TRAINING NETWORK.

**PI.** Joaquín Gadea Mateos; Pilar Coy Fuster (coordinator)

**Group.** Toxicology and risk evaluation

**Area 3.** Digestive, metabolic and endocrine diseases

**Date star/end.** 01-11-2015 / 31-10-2019

### REPBIOTECH ITN-EUROPEAN JOINT DOCTORAL PROGRAMME REPBIOTECH A MARIE-SKLODOWSKA CURIE INNOVATIVE TRAINING NETWORK-EJD COORDINATED BY THE UNIVERSITY OF MURCIA

**PI.** Sebastián Cánovas Bernabé

**Group.** Reproductive physiology and assisted reproduction

**Area 7.** Biotechnology. Biosciences Health applications

**Date star/end.** 01-11-2015 / 31-10-2019

### EUROPEAN JOINT DOCTORATE IN BIOLOGY AND TECHNOLOGY OF REPRODUCTIVE HEALTH

**PI.** Manuel Avilés Sánchez

**Group.** Functional and morphologic integration of cells and tissues

**Area 1.** Hematology and clinical experimental oncology. Clinical genetics

**Fecha inicio/fin.** 01-11-2015 / 31-10-2019



# RESEARCH ACTIVITY

# AREAS AND RESOURCES GROUPS



# AREA 1: HEMATOLOGY AND CLINICAL EXPERIMENTAL ONCOLOGY. CLINICAL GENETICS

Area 1 of the IMIB is made up of seven research groups, five of which are consolidated and two are emerging. This Area has a translational background and covers two major fields: hematology and cancer. The staff of this Area is made up of 146 people [26 principal investigators (R3+R4), 79 (R2) with 14 that are responsible for clinical trials and 9 post-doctoral among others, 20 pre-doctoral investigators (R1), and 21 technicians]. Half of the staff belongs to a clinical area and the other is basic, with 58% women.

In general, the year 2019 has shown a decrease in scientific production concerning the number of manuscripts compared to the previous year (116 in 2018 vs. 96 in 2019) but the accumulated impact factor has increased by more than 20% (487 vs. 600). Meaning that quality and visibility of the scientific production has increased, this was an objective for the present year. The percentage of articles published in the first quartile of the specialty has increased in comparison with last year in 15 points (42% vs. 57%). To note, almost 30% of the publications are included in the first decile. The trend with previous years is a clear increase in productivity. The collaboration of members of groups from Area 1 in international multicenter studies is again a very relevant part of the research activity, with several high-impact publications in journals such as Cell, Lancet Oncology or Journal of Clinical Oncology.

Regarding financing, the groups in this Area received 9 national projects and 4 regional ones. Our Area lacks international funding and an effort should be made in the coming years to promote the concession of this type of projects. Special mention must be made to the development of clinical trials. Investigators of our area were involved in 110 clinical trials (25% of the IMIB). Again, the collaboration of researchers between groups in Area 1 and other areas has continued to grow in 2019, but even more effort must be devoted to this aspect to improve it in the coming years.

Similarly, another effort should be focused on obtaining patents, which is a very important part of R & D, since again there have been no patents this year in our area. During this year, there has been a notable increase in the visibility of the research carried out in the Institute, which is very positive for the IMIB. This was also an objective and further effort must be done in this aspect to achieve the goal that civil society in Murcia knows the work that the IMIB and its investigators are performing and the social impact and benefits that they can get.

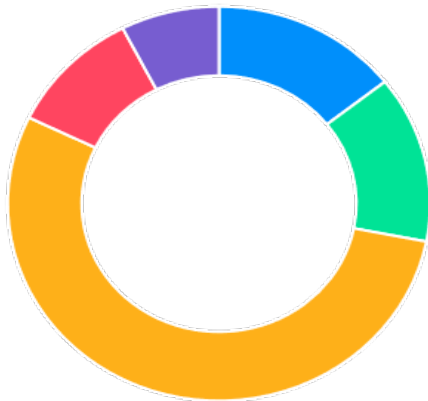
Finally, an important part of the research lies in the training of future investigators. In this aspect, there is an important teaching and training activity in Bachelor's and Master's degrees, in addition to the training of resident doctors in the most basic aspects of research. This

year 3 Thesis have been defended.

The area has 7 groups:

- › Clinical-Experimental Medical Hematology and Oncology
- › Molecular Control of Proliferation and Differentiation
- › Molecular Therapies and Biomarkers of Solid Tumors
- › Morfofunctional Integration of Cells and Tissues
- › Venous Thromboembolism
- › Non-Conventional Anti-Tumor Metallodrugs
- › Molecular and Pharmacogenetic Pathology

These groups have a total of 146 researchers:



Research classification (Euraxess)

- Others
- R1
- R2
- R3
- R4

| OTHER | R1 | R2 | R3 | R4 | TOTAL |
|-------|----|----|----|----|-------|
| 21    | 20 | 79 | 15 | 11 | 146   |



COORDINATOR OF AREA 1  
DR. CONSTANTINO MARTÍNEZ GÓMEZ

Selected publications based on the leadership of researchers and the last author or author of correspondence (marked with an asterisk) and ordered by the impact factor of the journal:

**CARMONA-BAYONAS A\***, Jimenez-Fonseca P, Lamarca A et al.

Prediction of Progression-Free Survival in Patients With Advanced, Well-Differentiated, Neuroendocrine Tumors Being Treated With a Somatostatin Analog: The GETNE-TRASGU Study. *Journal of Clinical Oncology*, 2019, 37, 2571-2580, PMID: 31390276, FI: 28.245, Original

**DE LA MORENA-BARRIO ME, SALLOUM-ASFAR S**, Esteban J, ..., **CORRAL J\***.

Archeogenetics of F11 p.Cys38Arg: a 5400-year-old mutation identified in different southwestern European countries. *Blood*, 2019, 133, 2618-2622, PMID: 31043424, FI: 16.562, Original

Novohradsky V, Rovira A, Hally C, Galindo A, **VIGUERAS G, ..., RUIZ J\***, Brabec V, Marchán V. Towards Novel Photodynamic Anticancer Agents Generating Superoxide Anion Radicals: A Cyclometalated Ir(III) Complex Conjugated to a Far-Red Emitting Coumarin. *Angewandte Chemie-International Edition*, 2019, 58, 6311-6315, PMID: 30889300, FI: 12.257, Original

**DE LA MORENA-BARRIO ME**, Wypasek E, Owczarek D, **MINANO A, VINCENTE V, CORRAL J\***, Undas A.

MPI-CDG with transient hypoglycosylation and antithrombin deficiency. *Haematologica*, 2019, 104, e79-e82, PMID: 30545931, FI: 7.57, Original

Lamas-Toranzo I, Fonseca Balvis N, Querejeta-FernandezA, **IZQUIERDO-RICO MJ, GONZÁLEZ-BRUSI L, ..., AVILES M\***, Bermejo-Álvarez P.

ZP4 confers structural properties to the zona pellucida essential for embryo development. *Elife*, 2019, 8, PMID: 31635692, FI: 7.551, Original

List of remaining publications in the area during 2019 ordered by impact factor (at least the first author affiliated to the IMIB is identified in bold. In addition an asterisk indicates if the last or corresponding author is affiliated to the IMIB. A # identifies publications of researchers recently affiliated to the IMIB and whose 2019 production comes from their previous research centers):

# Georgouli M, **HERRAIZ C**, Crosas-Molist E et al.

Regional Activation of Myosin II in Cancer Cells Drives Tumor Progression via a Secretory Cross-Talk with the Immune Microenvironment. *Cell*, 2019, 176, 757-774.e23, PMID: 30712866, FI: 36.216, Original

Farge D, Frere C, Connors JM et al. COLABORADORES: Ageno W, Ajauro F, Al-Aboudi KR, ..., **TRUJILLO-SANTOS J** et al.

2019 international clinical practice guidelines for the treatment and prophylaxis of venous thromboembolism in patients with cancer.

*Lancet Oncology*, 2019, 20, e566-e581, PMID: 31492632, FI: 35.386, Revisión

Castro E, Romero-Laorden N, Del Pozo A, ..., **GONZALEZ-BILLALABEITIA E** et al.

PROREPAIR-B: A Prospective Cohort Study of the Impact of Germline DNA Repair Mutations on the Outcomes of Patients With Metastatic Castration-Resistant Prostate Cancer.

*Journal of Clinical Oncology*, 2019, 37, 490-503, PMID: 30625039, FI: 28.245, Original

Conteduca V, Jayaram A, Romero-Laorden N, ..., **GONZALEZ-BILLALABEITIA E** et al.

Plasma Androgen Receptor and Docetaxel for Metastatic Castration-resistant Prostate Cancer.

*European Urology*, 2019, 75, 368-373, PMID: 30773204, FI: 17.298, Original

Lee RH, Piatt R, Dhenge A, **LOZANO ML** et al.

Impaired hemostatic activity of healthy transfused platelets in inherited and acquired platelet disorders: Mechanisms and implications.

*Science Translational Medicine*, 2019, 11, PMID: 31826978, FI: 17.161, Original

# Davizon-Castillo P, McMahon B, **AGUILA S** et al.

TNF-alpha-driven inflammation and mitochondrial dysfunction define the platelet hyperreactivity of aging.

*Blood*, 2019, 134, 727-740, PMID: 31311815, FI: 16.562, Original

# **AGUILA S**, Lavin M, Dalton N et al.

Increased galactose expression and enhanced clearance in patients with low von Willebrand factor.

*Blood*, 2019, 133, 1585-1596, PMID: 30770394, FI: 16.562, Original

Rosinol L, Oriol A, Rios R, ..., **MORALEDA JM** et al.

Bortezomib, lenalidomide, and dexamethasone as induction therapy prior to autologous transplant in multiple myeloma.

*Blood*, 2019, 134, 1337-1345, PMID: 31484647, FI: 16.562, Original

Papareddy P, Rosnagel M, Doreen Hollwedel F, ..., **MARTINEZ-MARTINEZ I** et al.

A human antithrombin isoform dampens inflammatory responses and protects from organ damage during bacterial infection.

*Nature Microbiology*, 2019, 4, 2442-2455, PMID: 31548687, FI: 14.3, Original

Vogt EJ, Tokuhiko K, Guo M, ..., **MOVILLA MJ** et al.

Anchoring cortical granules in the cortex ensures trafficking to the plasma membrane for post-fertilization exocytosis.

*Nature Communications*, 2019, 10, 2271, PMID: 31118423, FI: 11.878, Original

Puig N, Paiva B, Lasa M, ..., **DE ARRIBA F** et al.

Flow cytometry for fast screening and automated risk assessment in systemic light-chain amyloidosis.

*Leukemia*, 2019, 33, 1256-1267, PMID: 30542145, FI: 9.944, Original

Martinez-Monseny AF, Bolasell M, Callejon-Poo L, ..., **DE LA MORENA E** et al.

AZATAX: Acetazolamide safety and efficacy in cerebellar syndrome in PMM2 congenital disorder of glycosylation (PMM2-CDG).

*Annals of Neurology*, 2019, 85, 740-751, PMID: 30873657, FI: 9.496, Original

# Carrillo-Cruz E, Garcia-Lozano JR, Marquez-Malaver FJ, ..., **LOPEZ-GODINO O** et al.

Vitamin D Modifies the Incidence of Graft-versus-Host Disease after Allogeneic Stem Cell Transplantation Depending on the Vitamin D Receptor (VDR) Polymorphisms.

*Clinical Cancer Research*, 2019, 25, 4616-4623, PMID: 31043390, FI: 8.911, Original

Rodriguez-Otero P, Mateos MV, Martinez-Lopez J, ..., **DE ARRIBA F** et al.

Predicting long-term disease control in transplant-ineligible patients with multiple myeloma: impact of an MGUS-like signature.

*Blood Cancer Journal*, 2019, 9, 36, PMID: 30886139, FI: 7.895, Original

**DE LA MORENA-BARRIO B**, Orlando C, **DE LA MORENA-BARRIO ME**, ..., **CORRAL J\***.

Incidence and features of thrombosis in children with inherited antithrombin deficiency.

*Haematologica*, 2019, 104, 2512-2518, PMID: 30975910, FI: 7.57, Original

Garcia-Marco JA, Jimenez JL, Recasens V, ..., **MALO MDG** et al.

High prognostic value of measurable residual disease detection by flow cytometry in chronic lymphocytic leukemia patients treated with front-line fludarabine, cyclophosphamide, and rituximab, followed by three years of rituximab maintenance.

*Haematologica*, 2019, 104, 2249-2257, PMID: 30890600, FI: 7.57, Original

Genesca E, Morgades M, Montesinos P, ..., **AMIGO ML** et al.

Unique clinico-biological, genetic and prognostic features of adult early T cell precursor acute lymphoblastic leukemia.

*Haematologica*, 2019, haematol.2019.225078 [pii], PMID: 31537688, FI: 7.57, Original

Paciullo F, Bury L, Noris P, ..., **RIVERA J** et al.

Antithrombotic prophylaxis for surgery-associated venous thromboembolism risk in patients with inherited platelet disorders. The SPATA-DVT Study.

*Haematologica*, 2019, haematol.2019.227876 [pii], PMID: 31558677, FI: 7.57, Original

Galvan I, **SOLANO F**, Zougagh M et al.

Unprecedented high catecholamine production causing hair pigmentation after urinary excretion in red deer.

*Cellular and Molecular Life Sciences*, 2019, 76, 397-404, PMID: 30413834, FI: 7.014, Original

Conteduca V, Castro E, Wetterskog D, ..., **GONZALEZ-BILLALABEITIA E** et al.

Plasma AR status and cabazitaxel in heavily treated metastatic castration-resistant prostate cancer.

*European Journal of Cancer*, 2019, 116, 158-168, PMID: 31200322, FI: 6.68, Original

Danese E, Raimondi S, Montagnana M, ..., **GONZALEZ-CONEJERO R** et al.

Effect of CYP4F2, VKORC1, and CYP2C9 in Influencing Coumarin Dose: A Single-Patient Data Meta-Analysis in More Than 15,000 Individuals.

*Clinical Pharmacology & Therapeutics*, 2019, 105, 1477-1491, PMID: 30506689, FI: 6.336, Original

**BALLESTER FJ, ORTEGA E**, Porto V, ..., **RUIZ J\***.

New half-sandwich ruthenium(ii) complexes as proteosynthesis inhibitors in cancer cells.

*Chemical Communications*, 2019, 55, 1140-1143, PMID: 30631876, FI: 6.164, Original

Ribera JM, Garcia O, Moreno MJ, ..., **AMIGO ML** et al.

Incidence and outcome after first molecular versus overt recurrence in patients with Philadelphia chromosome-positive acute lymphoblastic leukemia included in the ALL Ph08 trial from the Spanish PETHEMA Group.

*Cancer*, 2019, 125, 2810-2817, PMID: 31012967, FI: 6.102, Original

**RIVERA-CARAVACA JM, MARIN F, VILCHEZ JA, ..., ROLDAN V\***.

Refining Stroke and Bleeding Prediction in Atrial Fibrillation by Adding Consecutive Biomarkers to Clinical Risk Scores.

*Stroke*, 2019, 50, 1372-1379, PMID: 31084333, FI: 6.046, Original

Novohradsky Vojtech, **VIGUERAS GLORIA**, Pracharova Jitka, ..., **RUIZ JOSE\*** et al.

Molecular superoxide radical photogeneration in cancer cells by dipyridophenazine iridium(III) complexes

*Inorganic Chemistry Frontiers*, 2019, 6, PMID: -, FI: 5.934, Original

**ESTEBAN-GIL A\*, PEREZ-SANZ F, GARCIA-SOLANO J, ..., CONESA-ZAMORA P\*.**

ColPortal, an integrative multiomic platform for analysing epigenetic interactions in colorectal cancer.

*Scientific Data*, 2019, 6, 255, PMID: 31672979, FI: 5.929, Original

Aparicio J, Sanchez-Munoz A, Ochendusko S, ..., **GONZALEZ-BILLALABEITIA E** et al.

Treatment and Outcome of Patients with Stage IS Testicular Cancer: A Retrospective Study from the Spanish Germ Cell Cancer Group.

*Journal of Urology*, 2019, 202, 742-747, PMID: 31163007, FI: 5.647, Original

Solis-Hernandez MP, Fernandez Del Valle A, **CARMONA-BAYONAS A** et al.

Evaluating radiological response in pancreatic neuroendocrine tumours treated with sunitinib: comparison of Choi versus RECIST criteria (CRIPNET\_GETNE1504 study).

*British Journal of Cancer*, 2019, 121, 537-544, PMID: 31477779, FI: 5.416, Original

Fernandez Montes A, Lopez Lopez C, Argiles Martinez G, ..., **CARMONA-BAYONAS A.**

Prognostic Nomogram and Patterns of Use of FOLFIRI-Aflibercept in Advanced Colorectal Cancer: A Real-World Data Analysis.

*Oncologist*, 2019, 24, e687-e695, PMID: 31147489, FI: 5.252, Original

**LUENGO-GIL G**, Garcia-Martinez E, Chaves-Benito A, ..., **AYALA DE LA PENA F\***.

Clinical and biological impact of miR-18a expression in breast cancer after neoadjuvant chemotherapy.

*Cellular Oncology*, 2019, 42, 627-644, PMID: 31115881, FI: 5.02, Original

Gonzalez JJ, **ORTEGA E**, Rothemund M, ..., Ruiz J\*.

Luminescent Gold(I) Complexes of 1-Pyridyl-3-anthracenylchalcone Inducing Apoptosis in Colon Carcinoma Cells and Antivascular Effects.

*Inorganic Chemistry*, 2019, 58, 12954-12963, PMID: 31550148, FI: 4.85, Original

Pascreau T, **DE LA MORENA-BARRIO ME**, Lasne D et al.

Elevated thrombin generation in patients with congenital disorder of glycosylation and combined coagulation factor deficiencies.

*Thrombosis and Haemostasis*, 2019, 17, 1798-1807, PMID: 31271700, FI: 4.733, Original

Martos L, Fernandez-Pardo A, Lopez-Fernandez MF, ..., **ROLDAN V** et al.

Identification of 58 Mutations (26 Novel) in 94 of 109 Symptomatic Spanish Proband with Protein C Deficiency.

*Thrombosis and Haemostasis*, 2019, 119, 1409-1418, PMID: 31254973, FI: 4.733, Original

**CARMONA-BAYONAS A\***, Jimenez-Fonseca P, Garrido M et al.  
Multistate Models: Accurate and Dynamic Methods to Improve Predictions of Thrombotic Risk in Patients with Cancer.  
*Thrombosis and Haemostasis*, 2019, 119, 1849-1859, PMID: 31461750, FI: 4.733, Original

**GONZALEZ-BILLALABEITIA E\***, Conteduca V, Wetterskog D et al.  
Circulating tumor DNA in advanced prostate cancer: transitioning from discovery to a clinically implemented test.  
*Prostate Cancer and Prostatic Diseases*, 2019, 22, 195-205, PMID: 30413805, FI: 4.6, Revisión

Altassan R, Peanne R, Jaeken J, ..., **CORRAL J** et al.  
International clinical guidelines for the management of phosphomannomutase 2-congenital disorders of glycosylation: Diagnosis, treatment and follow up.  
*Journal of Inherited Metabolic Disease*, 2019, 42, 5-28, PMID: 30740725, FI: 4.287, Revisión

Cuenca-Zamora EJ, **FERRER-MARIN F\***, **RIVERA J**, **TERUEL-MONTOYA R**.  
Tubulin in Platelets: When the Shape Matters.  
*International Journal of Molecular Sciences*, 2019, 20, PMID: 31315202, FI: 4.183, Revisión

**TERUEL-MONTOYA R\***, **LUENGO-GIL G**, Vallejo F, ..., **MARTINEZ-MARTINEZ I\***.  
Differential miRNA expression profile and proteome in plasma exosomes from patients with paroxysmal nocturnal hemoglobinuria.  
*Scientific Reports*, 2019, 9, 3611, PMID: 30837665, FI: 4.011, Original

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*Scientific Reports*, 2019, 9, 16979, PMID: 31740715, FI: 4.011, Original

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*Orphanet Journal of Rare Diseases*, 2019, 14, 196, PMID: 31399146, FI: 3.687, Original

Siniscalchi C, Quintavalla R, Rocci A, ..., **TRUJILLO-SANTOS J** et al.  
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*European Journal of Internal Medicine*, 2019, 68, 30-35, PMID: 31427187, FI: 3.66, Original

**GARCIA DE GUADIANA-ROMUALDO L\***, Jimenez-Santos E, **CEREZUELA-FUENTES P, ..., ALBALADEJO-OTON MD.**  
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*Clinical Chemistry and Laboratory Medicine*, 2019, 57, 540-548, PMID: 30240355, FI: 3.638, Original

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*Biology of Blood and Marrow Transplantation*, 2019, 25, 1703-1712, PMID: 31054983, FI: 3.599, Original

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*Pharmacogenomics Journal*, 2019, 19, 83-96, PMID: 30287909, FI: 3.503, Original

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*Breast*, 2019, 44, 108-112, PMID: 30735899, FI: 3.494, Original

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Molecular Diagnosis of Inherited Coagulation and Bleeding Disorders.  
*Seminars in Thrombosis and Hemostasis*, 2019, 45, 695-707, PMID: 31041795, FI: 3.401, Revisión

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*Biochimie*, 2019, 165, 245-249, PMID: 31445073, FI: 3.362, Original

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*Histopathology*, 2019, 75, 496-507, PMID: 31025430, FI: 3.294, Original

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*Transfusion*, 2019, 59, 981-988, PMID: 30597571, FI: 3.111, Original

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*Platelets*, 2019, 30, 535-539, PMID: 30849270, FI: 3.106, Original

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Identification of novel variants in ten patients with Hermansky-Pudlak syndrome by high-throughput sequencing.  
*Annals of Medicine*, 2019, 51, 141-148, PMID: 30990103, FI: 3.049, Original

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*Surgical Oncology-Oxford*, 2019, 31, 26-32, PMID: 31493647, FI: 3.0, Original

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*Bmc Cancer*, 2019, 19, 1143, PMID: 31771533, FI: 2.933, Original

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*Mutagenesis*, 2019, gez039 [pii], PMID: 31784758, FI: 2.898, Original

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*Asian Journal of Andrology*, 2019, 10.4103/aja.aja\_104\_19 [doi], PMID: 31621655, FI: 2.862, Original

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*Annals of Hematology*, 2019, 98, 2151-2162, PMID: 31312927, FI: 2.85, Original

Fernandez-Caballero M, **SALMERON D, DOLORES CHIRLAQUE M, ..., JEREZ A\*, DE ARRIBA F.**

Increasing therapy-related myeloid neoplasms in multiple myeloma.

*European Journal of Clinical Investigation*, 2019, 49, e13050, PMID: 30422316, FI: 2.784, Original

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*Plos one*, 2019, 14, e0218500, PMID: 31509528, FI: 2.776, Original

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Genetic polymorphisms in genes of class switch recombination and multiple myeloma risk and survival: an IMMEnSE study.

*Leukemia & Lymphoma*, 2019, 60, 1803-1811, PMID: 30633655, FI: 2.674, Original

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Efficacy and safety of peri-procedural bridging therapy with low molecular weight heparin in atrial fibrillation patients under vitamin K antagonists.

*Qjm-An International Journal of Medicine*, 2019, 112, 183-188, PMID: 30380132, FI: 2.649, Original

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*Expert Review of Hematology*, 2019, 12, 397-405, PMID: 31116611, FI: 2.505, Revisión

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Psychometric properties and factorial analysis of invariance of the Satisfaction with Life Scale (SWLS) in cancer patients.

*Quality of Life Research*, 2019, 28, 1255-1264, PMID: 30644028, FI: 2.488, Original

Carriles C, Jimenez-Fonseca P, Sanchez-Canovas M, ..., **CARMONA-BAYONAS A** et al.

Trifluridine/Tipiracil (TAS-102) for refractory metastatic colorectal cancer in clinical practice: a feasible alternative for patients with good performance status.

*Clinical & Translational Oncology*, 2019, 21, 1781-1785, PMID: 31209792, FI: 2.441, Original

Calderon C, **CARMONA-BAYONAS A**, Hernandez R et al.

Incidence of sleep problems and their mediating role on depression and anxious preoccupation in patients with resected, non-advanced cancer: data from NEOcoping study.

*Clinical & Translational Oncology*, 2019, 21, 1104-1107, PMID: 30712235, FI: 2.441, Original

**CARMONA-BAYONAS A**, Jimenez-Fonseca P, de Castro EM, ..., Ayala de la Pena F\*.

SEOM clinical practice guideline: management and prevention of febrile neutropenia in adults with solid tumors (2018).

*Clinical & Translational Oncology*, 2019, 21, 75-86, PMID: 30470991, FI: 2.441, Original

**AYALA DE LA PENA F\***, Andres R, Garcia-Saenz JA et al.

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*Clinical & Translational Oncology*, 2019, 21, 18-30, PMID: 30443868, FI: 2.441, Original

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*Clinical & Translational Oncology*, 2019, 21, 467-478, PMID: 30298467, FI: 2.441, Original

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*Clinical & Translational Oncology*, 2019, 21, 687-691, PMID: 30284234, FI: 2.441, Original

**PINERO-MADRONA A\***, Ruiz-Merino G, **CEREZUELA FUENTES P, ..., CABEZAS-HERRERA J.**

Mitotic rate as an important prognostic factor in cutaneous malignant melanoma.

*Clinical & Translational Oncology*, 2019, 21, 1348-1356, PMID: 30783917, FI: 2.441, Original

Calderon C, **CARMONA-BAYONAS A**, Jara C et al.

Emotional functioning to screen for psychological distress in breast and colorectal cancer patients prior to adjuvant treatment initiation.

*European Journal of Cancer Care*, 2019, 28, e13005, PMID: 30761638, FI: 2.421, Original

**RIVERA-CARAVACA JM, MARIN F, ESTEVE-PASTOR MA, ..., ROLDAN V\***.

Murcia atrial fibrillation project II: protocol for a prospective observational study in patients with atrial fibrillation.

*Bmj Open*, 2019, 9, e033712, PMID: 31843852, FI: 2.376, Original

Mellado M, **TRUJILLO-SANTOS J**, Bikdeli B et al.

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*Internal and Emergency Medicine*, 2019, 14, 1101-1112, PMID: 31054013, FI: 2.335, Original

Garcia de Gadiana-Romualdo L, **ALBALADEJO-OTON MD**, Berger M, ..., **TRUJILLO-SANTOS J**.

Prognostic performance of pancreatic stone protein in critically ill patients with sepsis.

*Biomarkers in Medicine*, 2019, 13, 1469-1480, PMID: 31621373, FI: 2.268, Original

Garcia-Cadenas I, Yanez L, Jarque I, ..., **HERAS I** et al.

Frequency, characteristics, and outcome of PTLD after allo-SCT: A multicenter study from the Spanish group of blood and marrow transplantation (GETH).

*European Journal of Haematology*, 2019, 102, 465-471, PMID: 30828868, FI: 2.217, Original

Barba P, Morgades M, Montesinos P, ..., **AMIGO ML** et al.

Increased survival due to lower toxicity for high-risk T-cell acute lymphoblastic leukemia patients in two consecutive pediatric-inspired PETHEMA trials.

*European Journal of Haematology*, 2019, 102, 79-86, PMID: 30267597, FI: 2.217, Original

**GARCIA DE GUADIANA-ROMUALDO L\***, **CEREZUELA-FUENTES P**, Espanol-Morales I, ..., **ALBALADEJO-OTON MD**.

Prognostic value of procalcitonin and lipopolysaccharide binding protein in cancer patients with chemotherapy-associated febrile neutropenia presenting to an emergency department.

*Biochemia Medica*, 2019, 29, 010702, PMID: 30591812, FI: 2.202, Original

# Bastida JM, **LOPEZ-GODINO O**, Vicente-Sanchez A et al.

Hidden myelodysplastic syndrome (MDS): A prospective study to confirm or exclude MDS in patients with anemia of uncertain etiology.

*International Journal of Laboratory Hematology*, 2019, 41, 109-117, PMID: 30290085, FI: 2.073, Original

Sanchez J, Garcia A, Ruiz JM, ..., **GUTIERREZ AM\***.  
Porcine Breed, Sex, and Production Stage Influence the Levels of Health Status Biomarkers in Saliva Samples.  
*Frontiers in Veterinary Science*, 2019, 6, 32, PMID: 30838222, FI: 2.029, Original

Sastre Lozano VM, **MORAN SANCHEZ S, GARCIA SOLANO J** et al.  
Relationship between the polyp detection rate and the post-colonoscopy colorectal cancer rate.  
*Revista Española de Enfermedades Digestivas*, 2019, 111, 598-602, PMID: 31190550, FI: 1.858, Original

Garcia Garcia Y, de Juan Ferre A, Mendiola C, ..., **GARCIA-MARTINEZ E** et al.  
Efficacy and safety results from GEICO 1205, a randomized phase II trial of neoadjuvant chemotherapy with or without bevacizumab for advanced epithelial ovarian cancer.  
*International Journal of Gynecological Cancer*, 2019, 29, 1050-1056, PMID: 31263024, FI: 1.746, Original

Hernandez R, Calderon C, **CARMONA-BAYONAS A** et al.  
Differences in coping strategies among young adults and the elderly with cancer.  
*Psychogeriatrics*, 2019, 19, 426-434, PMID: 30723983, FI: 1.518, Original

**GARCIA DE GUADIANA-ROMUALDO L\***, Ramos-Arenas V, Campos-Rodriguez V, ..., **ALBALADE-JO-OTON MD**.  
In vitro stability of B-type natriuretic peptide (BNP) in plasma stored under different conditions when measured with the Lumipulse((R)) assay.  
*Scandinavian Journal of Clinical & Laboratory Investigation*, 2019, 79, 455-458, PMID: 31244337, FI: 1.38, Original

Fuentes HE, Tafur AJ, Caprini JA, ..., **TRUJILLO-SANTOS J** et al.  
Prediction of early mortality in patients with cancer-associated thrombosis in the RIETE Database.  
*International Angiology*, 2019, 38, 173-184, PMID: 31112023, FI: 1.279, Original

Bravo-Perez C, Rodenas T, Esteban J, ..., **VICENTE V\***, **CORRAL J**.  
Gynaecological and obstetrical bleeding in Caucasian women with congenital factor XI deficiency: Results from a twenty-year, retrospective, observational study.  
*Medicina Clinica*, 2019, 153, 373-379, PMID: 30926156, FI: 1.277, Original

Wojcik M, **DE LA MORENA-BARRIO ME**, Michalik J et al.  
A series of 10 Polish patients with thromboembolic events and antithrombin deficiency: two new c.1154-1 G>C and c.1219-534 A>G SERPINC1 gene splicing mutations.  
*Blood Coagulation & Fibrinolysis*, 2019, 30, 193-198, PMID: 31157679, FI: 1.12, Original

# AREA 2.

## CARDIOVASCULAR AND RESPIRATORY DISEASES

The Area 2 of the Institute was formed by 6 research groups dedicated to Cardiovascular and Respiratory Diseases; 4 of which were consolidated groups. There were 136 investigators: 16 primary investigators, 13 clinical trial investigators, 79 collaborators, 4 postdoctoral investigators, 11 investigators in training and 10 senior research technicians. A 60% of the investigators belonged to clinical areas. A 51% of the investigators were women.

During the year 2019, the investigators of this Area have increased their capacity to engage in research projects. There were a total of 39 active competitive projects, 30 of which were national and 9 regional level. The number of clinical studies has globally increased to 87. Own-initiative projects have increased (PAT and non-PAT), but there was a mild reduction in the number of privately funded projects down to 29.

Research groups of Area 2 continued to participate actively in national research networks. The group on Clinical and Experimental Cardiology participated in the CIBER-CV (Centre of Biomedical Research on Cardiovascular Diseases); and the research group on Pediatrics was part of the networks RETICS ARADYAL (Thematic Network on Cooperative Health Investigation in Asthma, Adverse and Allergic Reactions) and SAMID (Network on Maternal Health and Child Development).

During the year 2019, the Area has sustained its scientific production compared to the previous year regarding the number of publications (80 papers in 2019 vs 79 in 2018). Despite that the proportion of publications amid the first quartile (59%) and the first decile (21%) have increased, the cumulative impact factor in 2019 has fallen (414 points in 2019 vs 514 points in 2018), as did the mean impact per publication (5.2 points in 2019 vs 6.5 points in 2018).

The manuscripts of major impact from each of the investigation groups were: New England Journal of Medicine, Lancet Diabetes & Endocrinology, Circulation, European Journal of Heart Failure, Journal of the American College of Cardiology, Revista Española de Cardiología (for group on Clinical and Experimental Cardiology); Thorax, Journal of Investigative Dermatology, Orphanet Journal of Rare Diseases, Journal of Physiology-London, Journal of Gynecologic Oncology (from group on Pediatrics); American Journal of Physiology-Renal Physiology (from group on Kidney Regulation and Blood Pressure)

Finally, the Area has increased its teaching capacity with a total of 28 doctoral theses in 2019 vs 23 doctoral theses produced in 2018.

The results from Area 2 were in keeping with the general aims of the Institute for 2019, which were to strengthen clinical and translational research, by facilitating investigator projects, consolidating groups and attracting new talent.

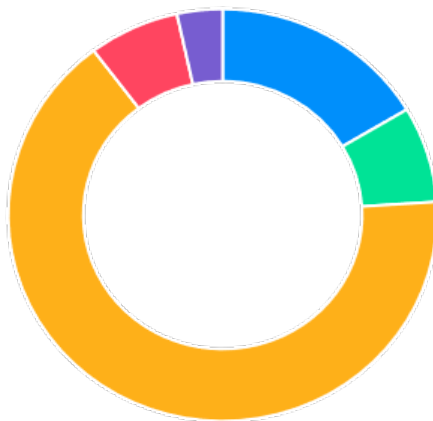
Area 2 has 7 groups:

- › Clinical and Experimental Cardiology
- › Research in Pediatrics
- › Respiratory Therapies in Acute Respiratory Failure
- › Kidney Regulation and Blood Pressure
- › Aerobiology and Environmental Toxicology
- › Medical Physiology

These groups have a total of 146 researchers:



**COORDINATOR OF AREA 2**  
**DR. JUAN RAMÓN GIMENO BLANES**



- Others
- R1
- R2
- R3
- R4

| OTHER | R1 | R2 | R3 | R4 | TOTAL |
|-------|----|----|----|----|-------|
| 24    | 11 | 96 | 10 | 5  | 146   |

Research classification (Euraxess)



Selected publications based on the leadership of researchers and the last author or author of correspondence (marked with an asterisk) and ordered by the impact factor of the journal:

**PASCUAL-FIGAL DA\***, Bayes-Genis A, **ASENSIO-LOPEZ MC, ..., LAX A.**

The Interleukin-1 Axis and Risk of Death in Patients With Acutely Decompensated Heart Failure. *Journal of the American College of Cardiology*, 2019, 73, 1016-1025, PMID: 30846095, FI: 18.639, Original

**MORALES E\***, Strachan D, Asher I, ..., **GARCIA-MARCOS L.**

Combined impact of healthy lifestyle factors on risk of asthma, rhinoconjunctivitis and eczema in school children: ISAAC phase III. *Thorax*, 2019, 74, 531-538, PMID: 30898896, FI: 9.64, Original

Fernandez-Gasso L, Hernando-Arizaleta L, Palomar-Rodriguez JA, ..., **PASCUAL-FIGAL DA\***.

Population-based Study of First Hospitalizations for Heart Failure and the Interaction Between Readmissions and Survival. *Revista Española de Cardiología*, 2019, 72, 740-748, PMID: 30262426, FI: 5.126, Original

Caro Martinez C, **ELVIRA RUIZ G, FLORES BLANCO PJ, ..., MANZANO FERNANDEZ S\***.

Prevalence and Prognostic Implications of Valve Disease in Patients With Atrial Fibrillation Initiating Direct Oral Anticoagulants. *Revista Española de Cardiología*, 2019, 72, 935-943, PMID: 30497945, FI: 5.126, Original

**ASENSIO-LOPEZ MC\***, Lax A, Fernandez Del Palacio MJ, ..., **PASCUAL-FIGAL DA\***.

Yin-Yang 1 transcription factor modulates ST2 expression during adverse cardiac remodeling post-myocardial infarction. *Journal of Molecular and Cellular Cardiology*, 2019, 130, 216-233, PMID: 30998979, FI: 5.055, Original

List of remaining publications in the area during 2019 ordered by impact factor (at least the first author affiliated to the IMIB is identified in bold. In addition an asterisk indicates if the last or corresponding author is affiliated to the IMIB:

Solomon SD, McMurray JJV, Anand IS et al. COLABORADORES: Perrone S, Albisu J, Avaca H, ..., **PASCUAL FIGAL D** et al.

Angiotensin-Nepirylsin Inhibition in Heart Failure with Preserved Ejection Fraction. *New England Journal of Medicine*, 2019, 381, 1609-1620, PMID: 31475794, FI: 70.67, Original

Ray KK, Colhoun HM, Szarek M et al. COLABORADORES: Schwartz GG, Steg PG, Bhatt DL, ..., **MA-RIN F** et al.

Effects of alirocumab on cardiovascular and metabolic outcomes after acute coronary syndrome in patients with or without diabetes: a prespecified analysis of the ODYSSEY OUTCOMES randomised controlled trial.

*Lancet Diabetes & Endocrinology*, 2019, 7, 618-628, PMID: 31272931, FI: 24.54, Original

Garcia-Pavia P, Kim Y, Restrepo-Cordoba MA, ..., **PASCUAL-FIGAL DA** et al.

Genetic Variants Associated With Cancer Therapy-Induced Cardiomyopathy.

*Circulation*, 2019, 140, 31-41, PMID: 30987448, FI: 23.054, Original

Chioncel O, Mebazaa A, Maggioni AP et al. COLABORADORES: Auer J, Ablasser K, Fruhwald F, ..., **PEREZ-MARTINEZ MT** et al.

Acute heart failure congestion and perfusion status - impact of the clinical classification on in-hospital and long-term outcomes; insights from the ESC-EORP-HFA Heart Failure Long-Term Registry.

*European Journal of Heart Failure*, 2019, 21, 1338-1352, PMID: 31127678, FI: 13.965, Original

Ponikowski P, Kirwan BA, Anker SD, ..., **PASCUAL-FIGAL DA** et al.

Rationale and design of the AFFIRM-AHF trial: a randomised, double-blind, placebo-controlled trial comparing the effect of intravenous ferric carboxymaltose on hospitalisations and mortality in iron-deficient patients admitted for acute heart failure.

*European Journal of Heart Failure*, 2019, 21, 1651-1658, PMID: 31883356, FI: 13.965, Original

Wachter R, Senni M, Belohlavek J, ..., **PASCUAL-FIGAL D** COLABORADORES: Gniot J, Mozheiko M, Lelonek M, ...

Initiation of sacubitril/valsartan in haemodynamically stabilised heart failure patients in hospital or early after discharge: primary results of the randomised TRANSITION study.

*European Journal of Heart Failure*, 2019, 21, 998-1007, PMID: 31134724, FI: 13.965, Original

Kapeliou CJ, Lainscak M, Savarese G et al. COLABORADORES: Auer J, Ablasser K, Fruhwald F, ..., **PEREZ-MARTINEZ MT** et al.

Sacubitril/valsartan eligibility and outcomes in the ESC-EORP-HFA Heart Failure Long-Term Registry: bridging between European Medicines Agency/Food and Drug Administration label, the PARADIGM-HF trial, ESC guidelines, and real world.

*European Journal of Heart Failure*, 2019, 21, 1383-1397, PMID: 31132222, FI: 13.965, Original

Jimenez Diaz VA, **TELLO-MONTOLIU A**, Moreno R et al.

Assessment of Platelet REACTivity After Transcatheter Aortic Valve Replacement: The REAC-TAVI Trial.

*Jacc-Cardiovascular Interventions*, 2019, 12, 22-32, PMID: 30621974, FI: 9.544, Original

Perica S JM, Llopis J, Gonzalez-Ramallo V et al. COLABORADORES: Fernandez Sanchez F, Nouredine M, Rosas G, ..., **DE LA MORENA VALENZUELA G** et al.

Outpatient Parenteral Antibiotic Treatment for Infective Endocarditis: A Prospective Cohort Study From the GAMES Cohort.

*Clinical Infectious Diseases*, 2019, 69, 1690-1700, PMID: 30649282, FI: 9.055, Original

Rutter CE, Silverwood RJ, Williams HC, ..., **GARCIA-MARCOS L** et al.

Are Environmental Factors for Atopic Eczema in ISAAC Phase Three due to Reverse Causation?

*Journal of Investigative Dermatology*, 2019, 139, 1023-1036, PMID: 30521836, FI: 6.29, Original

Boriani G, Fauchier L, Aguinaga L et al. COLABORADORES: Gorennek B, **MARIN F**, Dagnes N.

European Heart Rhythm Association (EHRA) consensus document on management of arrhythmias and cardiac electronic devices in the critically ill and post-surgery patient, endorsed by Heart Rhythm Society (HRS), Asia Pacific Heart Rhythm Society (APHRS), Cardiac Arrhythmia Society of Southern Africa (CASSA), and Latin American Heart Rhythm Society (LAHRS).

*Europace*, 2019, 21, 7-8, PMID: 29905786, FI: 6.1, Original

Lip GYH, Collet JP, Haude M, ..., **MARIN F** et al.

2018 Joint European consensus document on the management of antithrombotic therapy in atrial fibrillation patients presenting with acute coronary syndrome and/or undergoing percutaneous cardiovascular interventions: a joint consensus document of the European Heart Rhythm Association (EHRA), European Society of Cardiology Working Group on Thrombosis, European Association of Percutaneous Cardiovascular Interventions (EAPCI), and European Association of Acute Cardiac Care (ACCA) endorsed by the Heart Rhythm Society (HRS), Asia-Pacific Heart Rhythm Society (APHRS), Latin America Heart Rhythm Society (LAHRS), and Cardiac Arrhythmia Society of Southern Africa (CASSA).

*Europace*, 2019, 21, 192-193, PMID: 30052888, FI: 6.1, Original

Boriani G, Proietti M, Laroche C, ..., **MARIN F** et al.

Association between antithrombotic treatment and outcomes at 1-year follow-up in patients with atrial fibrillation: the EORP-AF General Long-Term Registry.

*Europace*, 2019, 21, 1013-1022, PMID: 30904925, FI: 6.1, Original

Lane DA, Dagnes N, Dan GA, ..., **MARIN F** et al.

Antithrombotic treatment in patients with atrial fibrillation and acute coronary syndromes: results of the European Heart Rhythm Association survey.

*Europace*, 2019, 21, 1116-1125, PMID: 30874724, FI: 6.1, Original

Martinez-Milla J, Raposeiras-Roubin S, **PASCUAL-FIGAL DA** et al.

Role of Beta-blockers in Cardiovascular Disease in 2019.

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*Journal of Physiology-London*, 2019, 597, 4959-4973, PMID: 31287560, FI: 4.95, Original

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*Clinical and Experimental Allergy*, 2019, 49, 430-441, PMID: 30508327, FI: 4.741, Original

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*Thrombosis and Haemostasis*, 2019, 119, 1901-1919, PMID: 31499565, FI: 4.733, Revisión

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*Archivos de Bronconeumología*, 2019, 55, 189-194, PMID: 30119934, FI: 4.214, Original

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Mitral Regurgitation and Prognosis After Non-ST-Segment Elevation Myocardial Infarction in Very Old Patients.  
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Non-biopsy diagnosis of familial amyloid cardiomyopathy.  
*Journal of Nuclear Cardiology*, 2019, 10.1007/s12350-019-01700-4 [doi], PMID: 30945209, FI: 4.112, Original

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Alcohol septal ablation for hypertrophic obstructive cardiomyopathy: a contemporary reappraisal.

*Eurointervention*, 2019, 15, 411-417, PMID: 30860070, FI: 4.018, Revisión

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*Scientific Reports*, 2019, 9, 11983, PMID: 31427717, FI: 4.011, Original

**HERNANDEZ-ROMERO D\***, Sanchez-Quinones J, **VILCHEZ JA, ..., MARIN F.**

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*Scientific Reports*, 2019, 9, 6235, PMID: 30996283, FI: 4.011, Original

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**BARREDA-SANCHEZ M\***, Buendia-Martinez J, **GLOVER-LOPEZ G, ..., GUILLEN-NAVARRO E\***.

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*European Journal of Internal Medicine*, 2019, 64, 63-71, PMID: 30904433, FI: 3.66, Original

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Impact of anemia as risk factor for major bleeding and mortality in patients with acute coronary syndrome.

*European Journal of Internal Medicine*, 2019, 61, 48-53, PMID: 30579651, FI: 3.66, Original

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Comorbidity assessment for mortality risk stratification in elderly patients with acute coronary syndrome.

*European Journal of Internal Medicine*, 2019, 62, 48-53, PMID: 30711360, FI: 3.66, Original

Pelliccia F, Limongelli G, Autore C, **GIMENO-BLANES JR** et al.  
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*International Journal of Cardiology*, 2019, 286, 239-243, PMID: 30409740, FI: 3.471, Original

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*International Journal of Cardiology*, 2019, 293, 137-142, PMID: 31200964, FI: 3.471, Original

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*Emergencias*, 2019, 31, 154-160, PMID: 31210446, FI: 3.35, Original

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Sex-dependent differences in the adverse renal changes induced by an early in life exposure to a high-fat diet.  
*American Journal of Physiology-Renal Physiology*, 2019, 316, F332-F340, PMID: 30516421, FI: 3.323, Original

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High and low on-treatment platelet reactivity to P2Y12 inhibitors in a contemporary cohort of acute coronary syndrome patients undergoing percutaneous coronary intervention.  
*Thrombosis Research*, 2019, 175, 95-101, PMID: 30738371, FI: 3.266, Original

**GARCIA-MOLINA E, SABATER-MOLINA M\*, LOPEZ-CUENCA D, ..., GIMENO BLANES JR.**  
A study of the pathogenicity of variants in familial heart disease. The value of cosegregation.  
*American Journal of Translational Research*, 2019, 11, 1724-1735, PMID: 30972196, FI: 3.266, Original

**PRIETO-SANCHEZ MT, BLANCO-CARNERO JE, RUIZ-PALACIOS M, ..., LARQUE E\***.  
Increased Alkaline Phosphatase in Cord Blood of Obese Diabetic Mothers Is Associated to Polyunsaturated Fatty Acid Levels.  
*Annals of Nutrition and Metabolism*, 2019, 75, 153-162, PMID: 31722334, FI: 3.051, Original

**TELLO-MONTOLIU A\***, Ruiz-Nodar JM, **ESTEVE-PASTOR MA, ..., MARIN F.**  
Chronic Kidney Disease and Third-Generation P2Y12 Inhibitors Use in Patients With Acute Coronary Syndrome: Impact on the Prognosis at 1 Year.  
*Journal of Clinical Pharmacology*, 2019, 59, 295-302, PMID: 30207603, FI: 2.915, Original

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*Journal of Gynecologic Oncology*, 2019, 30, e63, PMID: 31074246, FI: 2.914, Original

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*European Journal of Clinical Investigation*, 2019, 49, e13161, PMID: 31449685, FI: 2.784, Original

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*Clinical Rehabilitation*, 2019, 33, 504-515, PMID: 30442030, FI: 2.738, Original

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*International Journal of Medical Informatics*, 2019, 129, 198-204, PMID: 31445255, FI: 2.731, Original

**ORENES-PINERO E\***, **ESTEVE-PASTOR MA**, Ruiz-Nodar JM, ..., **MARIN F**.  
Under-prescription of novel antiplatelet drugs in patients with acute coronary syndrome and previous cardiovascular disease.

*Minerva Medica*, 2019, 110, 410-418, PMID: 31081301, FI: 2.475, Original

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*Journal of Nursing Management*, 2019, 27, 1485-1491, PMID: 31349371, FI: 2.386, Original

**SANCHEZ-SOLIS M\***.  
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*Frontiers in Pediatrics*, 2019, 7, 253, PMID: 31275912, FI: 2.349, Revisión

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Genetics and Gene-Environment Interactions in Childhood and Adult Onset Asthma.  
*Frontiers in Pediatrics*, 2019, 7, 499, PMID: 31921716, FI: 2.349, Revisión

Caro Martinez C, **CEREZO MANCHADO JJ**, **FLORES BLANCO PJ**, ..., **MANZANO FERNANDEZ S\***.  
Effectiveness and safety of rivaroxaban in nonvalvular atrial fibrillation: data from a contemporary Spanish registry.

*Current Medical Research and Opinion*, 2019, 35, 1463-1471, PMID: 30912682, FI: 2.345, Original

Gual M, Formiga F, Ariza-Sole A, ..., **MARIN F** et al.  
Diabetes mellitus, frailty and prognosis in very elderly patients with acute coronary syndromes.  
*Aging Clinical and Experimental Research*, 2019, 31, 1635-1643, PMID: 30671867, FI: 2.331, Original

**MELGAREJO-MESEGUER FRANCISCO-MANUEL**, Gimeno-Blanes Francisco-Javier, Salar-Alcaraz Maria-Eladia et al.  
Electrocardiographic Fragmented Activity (II): A Machine Learning Approach to Detection  
*Applied Sciences-Basel*, 2019, 9, PMID: -, FI: 2.217, Original

**MELGAREJO-MESEGUER FRANCISCO-MANUEL**, Gimeno-Blanes Francisco-Javier, **SALAR-ALCARAZ MARIA-ELADIA** et al.  
Electrocardiographic Fragmented Activity (I): Physiological Meaning of Multivariate Signal Decompositions  
*Applied Sciences-Basel*, 2019, 9, PMID: -, FI: 2.217, Original

Carrillo-Aleman L, **MARIN F**, **RIVERA-CARAVACA JM** et al.  
Switching of Oral P2Y12 Inhibitor Treatment in Patients with Acute Coronary Syndrome: Prevalence, Predictors, and Prognosis.  
*Clinical Drug Investigation*, 2019, 39, 275-283, PMID: 30623372, FI: 2.158, Original

Martinez-Ferrandez C, **MARTINEZ-SALCEDO E**, Casas-Fernandez C, ..., **DOMINGO-JIMENEZ R**.  
Long-term prognosis of childhood absence epilepsy.  
*Neurologia*, 2019, 34, 224-228, PMID: 28325560, FI: 2.038, Original

Vicent L, Cinca J, Vazquez-Garcia R, ..., **PASCUAL-FIGAL D** et al.  
Discharge treatment with angiotensin-converting enzyme inhibitor/angiotensin receptor blocker after a heart failure hospitalisation is associated with a better prognosis irrespective of left ventricular ejection fraction.  
*Internal Medicine Journal*, 2019, 49, 1505-1513, PMID: 30887642, FI: 1.767, Original

Morales-Rosello J, Galindo A, Herraiz I, ..., **DELGADO JL** et al.  
Is it possible to predict late antepartum stillbirth by means of cerebroplacental ratio and maternal characteristics?  
*Journal of Maternal-Fetal & Neonatal Medicine*, 2019, , 1-7, PMID: 30672365, FI: 1.569, Original

Vicent L, Ariza-Sole A, Diez-Villanueva P, ..., **MARIN F** et al.  
Statin Treatment and Prognosis of Elderly Patients Discharged after Non-ST Segment Elevation Acute Coronary Syndrome.  
*Cardiology*, 2019, 143, 14-21, PMID: 31390616, FI: 1.561, Original



Guinot M, **BLANCO JE, DELGADO JL** et al.

Acceptability, tolerability, and effects on symptoms and signs of vulvovaginitis of a non-soap, herbal-based intimate hygiene solution (Zelesse(R)).

*Journal of International Medical Research*, 2019, 47, 2626-2636, PMID: 31088247, FI: 1.351, Original

**ARRIBAS JM\***, Soriano L, **RIVERA-CARAVACA JM** et al.

Incidence and causes of pacemaker implantation during postoperative period of aortic valve replacement with rapid deployment prosthesis.

*Pace-Pacing and Clinical Electrophysiology*, 2019, 42, 1534-1540, PMID: 31677175, FI: 1.34, Original

Cuerpo GP, Valerio M, Pedraz A et al. COLABORADORES: Sanchez FF, Noureddine M, Rosas G, ..., **GONZALEZ J** et al.

Mitral valve repair in infective endocarditis is not inferior to valve replacement: results from a Spanish nationwide prospective registry.

*General Thoracic and Cardiovascular Surgery*, 2019, 67, 585-593, PMID: 30666586, FI: 1.219, Original

Cano-Garcinuno A, Praena-Crespo M, Mora-Gandarillas I et al. COLABORADORES: Calvo C, Cansino-Campuzano A, Flores-Gonzalez JC, ..., **GARCIA-MARCOS L** et al.

[Criteria heterogeneity in the diagnosis of acute bronchiolitis in Spain].

*Anales de Pediatría*, 2019, 90, 109-117, PMID: 30172561, FI: 1.166, Original

Pastor-Perez FJ, **GARCIA-ALBEROLA A, NAVARRO-PENALVER M, ..., PASCUAL-FIGAL DA.**

Lack of improvement in autonomic cardiac tone after sacubitril/valsartan at lower than target doses.

*Journal of Electrocardiology*, 2019, 52, 99-100, PMID: 30529813, FI: 1.166, Original

Sanchez-Serna J, **MARTINEZ-VILLANUEVA M**, Hernandez-Vicente A, ..., **PASCUAL-FIGAL DA.**

Galectina-3 as a biomarker of acute kidney injury risk in patients with decompensated heart failure.

*Revista Clínica Española*, 2019, 219, 315-319, PMID: 30737010, FI: 1.043, Original

# AREA 3: DIGESTIVE, ENDOCRINE AND METABOLIC DISEASES

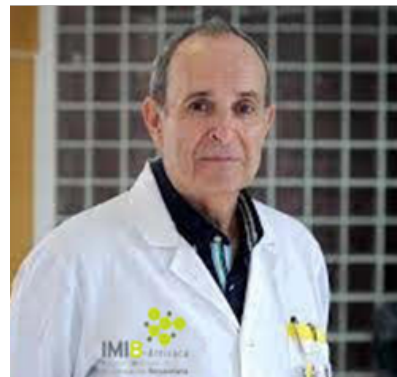
Area 3 is made up of seven research groups: Digestive Surgery, Endocrine and Abdominal Organ Transplantation; Nutrition; Clinical, Technological, Cellular and Molecular Bases in Digestive Medicine; Odontology; Surgical Research in the Health Area; Nutrition and Food Science; and finally Toxicology, and Risk Assessment.

The number of researchers in the Area has increased to 187, including 29 principal investigators and 8 investigators responsible for clinical trials, which in the Euraxess classification translate into 12 R3 investigators and 10 R4 investigators. Among researchers, there is a proportion close to parity regarding origin, whether we refer to gender or whether they are clinical or basic. The research work of these staff focuses on different lines, such as translational research in carcinogenesis and inflammation, transplantation of abdominal organs, endocrine surgical pathology, esophageal and rectal diseases, cooperative donor projects, nutrition, chronobiology, surgical research in the area of health, clinical management and dental research. These lines maintain 42 active funded research projects, of which 7 are internationally funded projects, as well as 7 ongoing clinical trials.

During 2019 116 original articles have been published (approximately the same as the previous year); of which 49% are in Q1, which has translated into 495.62 points of impact factor, a figure that increases compared to last year. The list of all the publications contributed by the seven groups in the Area is offered in this report. Finally, in Area 3, 16 Doctoral Theses have been defended, 4 with international mention.

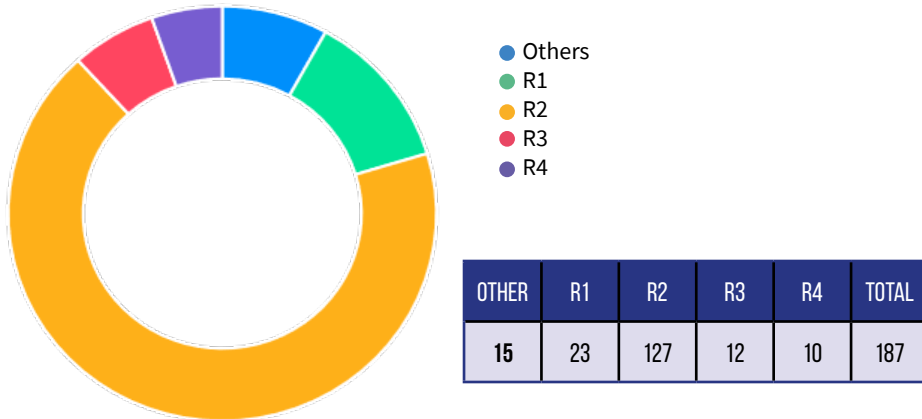
Area 3 has 7 groups.

- › Gastrointestinal Surgery, Endocrine and Abdominal Organ Transplantation
- › Nutrition
- › Clinical, Technological, Cellular and Molecular Bases in Digestive Medicine
- › Odontology
- › Surgical Research in the Health Area
- › Nutrition and Food Science
- › Toxicology and Risk Assessment



**COORDINATOR OF AREA 3**  
**DR. ANTONIO M. HERNÁNDEZ MARTÍNEZ**

These groups have a total of 187 researchers:



Research classification (Euraxess)

Selected publications based on the leadership of researchers and the last author or author of correspondence (marked with an asterisk) and ordered by the impact factor of the journal:

**LARQUE E**, Labayen I, Flodmark CE et al.

From conception to infancy - early risk factors for childhood obesity.

*Nature Reviews Endocrinology*, 2019, 15, 456-478, PMID: 31270440, FI: 24.646, Revisión

**TAPIA-ABELLAN A, ANGOSTO-BAZARRA D, MARTINEZ-BANACLOCHA H, ..., PELEGRIN P\***.

MCC950 closes the active conformation of NLRP3 to an inactive state.

*Nature Chemical Biology*, 2019, 15, 560-564, PMID: 31086329, FI: 12.154, Original

**MARTINEZ-GARCIA JJ, MARTINEZ-BANACLOCHA H, ANGOSTO-BAZARRA D, ..., PELEGRIN P\***.

P2X7 receptor induces mitochondrial failure in monocytes and compromises NLRP3 inflammasome activation during sepsis.

*Nature Communications*, 2019, 10, 2711, PMID: 31221993, FI: 11.878, Original

**BAROJA-MAZO A\*, REVILLA-NUIN B**, de Bejar A, ..., **PONS JA**.

Extracellular adenosine reversibly inhibits the activation of human regulatory T cells and negatively influences the achievement of the operational tolerance in liver transplantation.

*American Journal of Transplantation*, 2019, 19, 48-61, PMID: 30019408, FI: 7.163, Original

**LOPEZ-MINGUEZ J**, Dashti HS, **MADRID-VALERO JJ, MADRID JA, ..., ORDONANA JR\*, GARAU-LET M\***.

Heritability of the timing of food intake.

*Clinical Nutrition*, 2019, 38, 767-773, PMID: 29571565, FI: 6.402, Original

List of remaining publications in the area during 2019 ordered by impact factor (at least the first author affiliated to the IMIB is identified in bold. In addition an asterisk indicates if the last or corresponding author is affiliated to the IMIB. A # identifies publications of researchers recently affiliated to the IMIB and whose 2019 production comes from their previous research centers):

# **TOMAS-LOBA A**, Manieri E, Gonzalez-Teran B et al.  
p38gamma is essential for cell cycle progression and liver tumorigenesis.  
*Nature*, 2019, 568, 557-560, PMID: 30971822, FI: 43.07, Original

Blasco MT, Navas C, Martin-Serrano G, ..., **SANCHEZ-BUENO F** et al.  
Complete Regression of Advanced Pancreatic Ductal Adenocarcinomas upon Combined Inhibition of EGFR and C-RAF.  
*Cancer Cell*, 2019, 35, 573-587.e6, PMID: 30975481, FI: 23.916, Original

Hessheimer AJ, Coll E, Torres F, ..., **RAMIREZ P** et al.  
Normothermic regional perfusion vs. super-rapid recovery in controlled donation after circulatory death liver transplantation.  
*Journal of Hepatology*, 2019, 70, 658-665, PMID: 30582980, FI: 18.946, Original

Mensa-Vilaro A, Bravo Garcia-Morato M, de la Calle-Martin O, ..., **FUSTER JL** et al.  
Unexpected relevant role of gene mosaicism in patients with primary immunodeficiency diseases.  
*Journal of Allergy and Clinical Immunology*, 2019, 143, 359-368, PMID: 30273710, FI: 14.11, Original

Dashti HS, Jones SE, Wood AR, ..., **GARAULET M** et al.  
Genome-wide association study identifies genetic loci for self-reported habitual sleep duration supported by accelerometer-derived estimates.  
*Nature Communications*, 2019, 10, 1100, PMID: 30846698, FI: 11.878, Original

# Manieri E, Herrera-Melle L, Mora A, **TOMAS-LOBA A** et al.  
Adiponectin accounts for gender differences in hepatocellular carcinoma incidence.  
*Journal of Experimental Medicine*, 2019, 216, 1108-1119, PMID: 30944152, FI: 10.892, Original

Ripolles-Melchor J, Ramirez-Rodriguez JM, Casans-Frances R et al. COLABORADORES: Ripolles-Melchor J, Ramirez-Rodriguez JM, Zaragoza LB, ..., **SORIA-ALEDO V** et al.  
Association Between Use of Enhanced Recovery After Surgery Protocol and Postoperative Complications in Colorectal Surgery: The Postoperative Outcomes Within Enhanced Recovery After Surgery Protocol (POWER) Study.  
*Jama Surgery*, 2019, 10.1001/jamasurg.2019.0995 [doi], PMID: 31066889, FI: 10.668, Original

Galindo-Campos MA, Bedora-Faure M, Farres J, ..., **APARICIO P** et al.  
Coordinated signals from the DNA repair enzymes PARP-1 and PARP-2 promotes B-cell development and function.

*Cell Death and Differentiation*, 2019, 26, 2667-2681, PMID: 30996287, FI: 8.086, Original

Muntaner-Mas A, **MARTINEZ-NICOLAS A**, Lavie CJ et al.  
A Systematic Review of Fitness Apps and Their Potential Clinical and Sports Utility for Objective and Remote Assessment of Cardiorespiratory Fitness.

*Sports Medicine*, 2019, 49, 587-600, PMID: 30825094, FI: 7.583, Revisión

**PIZZUTO M\***, Lonez C, **BAROJA-MAZO A** et al.

Saturation of acyl chains converts cardiolipin from an antagonist to an activator of Toll-like receptor-4.

*Cellular and Molecular Life Sciences*, 2019, 76, 3667-3678, PMID: 31062071, FI: 7.014, Original

Vasconcelos DP, Aguas AP, Barbosa MA, **PELEGRIN P\*** et al.

The inflammasome in host response to biomaterials: Bridging inflammation and tissue regeneration.

*Acta Biomaterialia*, 2019, 83, 1-12, PMID: 30273748, FI: 6.638, Revisión

Vasconcelos DP, **DE TORRE-MINGUELA C**, **GOMEZ AI**, ..., **PELEGRIN P\*** et al.

3D chitosan scaffolds impair NLRP3 inflammasome response in macrophages.

*Acta Biomaterialia*, 2019, 91, 123-134, PMID: 31003033, FI: 6.638, Original

Barraco GM, **MARTINEZ-LOZANO N\***, Vales-Villamarin C, ..., **MADRID JA\***, ..., **GARAULET M\***.

Circadian health differs between boys and girls as assessed by non-invasive tools in school-aged children.

*Clinical Nutrition*, 2019, 38, 774-781, PMID: 29609867, FI: 6.402, Original

Rodriguez-Alcalde D, Carballal S, Moreira L, ..., **ESTEBAN P** et al.

High incidence of advanced colorectal neoplasia during endoscopic surveillance in serrated polyposis syndrome.

*Endoscopy*, 2019, 51, 142-151, PMID: 30068004, FI: 6.381, Original

Ruuskanen S, **ESPIN S**, Sanchez-Virosta P et al.

Transgenerational endocrine disruption: Does elemental pollution affect egg or nestling thyroid hormone levels in a wild songbird?

*Environmental Pollution*, 2019, 247, 725-735, PMID: 30721863, FI: 5.714, Original

Ruuskanen S, **ESPIN S**, Sanchez-Virosta P et al.

Transgenerational endocrine disruption: Does elemental pollution affect egg or nestling thyroid hormone levels in a wild songbird?

*Environmental Pollution*, 2019, 247, 725-735, PMID: 30721863, FI: 5.714, Original

Ruiz-Roca JA, **PONS-FUSTER E, LOPEZ-JORNET P\***.

Effectiveness of the Botulinum Toxin for Treating Sialorrhea in Patients with Parkinson's Disease: A Systematic Review.

*Journal of Clinical Medicine*, 2019, 8, PMID: 30845700, FI: 5.688, Revisión

# Castellano-Castillo D, Moreno-Indias I, Sanchez-Alcoholado L, **RAMOS-MOLINA B** et al.

Altered Adipose Tissue DNA Methylation Status in Metabolic Syndrome: Relationships Between Global DNA Methylation and Specific Methylation at Adipogenic, Lipid Metabolism and Inflammatory Candidate Genes and Metabolic Variables.

*Journal of Clinical Medicine*, 2019, 8, PMID: 30642114, FI: 5.688, Original

# Fernandez-Garcia JC, Delpino-Rius A, Samarra I, ..., **RAMOS-MOLINA B\*** et al.

Type 2 Diabetes Is Associated with a Different Pattern of Serum Polyamines: A Case(-)Control Study from the PREDIMED-Plus Trial.

*Journal of Clinical Medicine*, 2019, 8, PMID: 30634588, FI: 5.688, Original

**GOMEZ-ABENZA E**, Ibanez-Molero S, Garcia-Moreno D, ..., **GABELLINI C\***, **MULERO V\***.

Zebrafish modeling reveals that SPINT1 regulates the aggressiveness of skin cutaneous melanoma and its crosstalk with tumor immune microenvironment.

*Journal of Experimental & Clinical Cancer Research*, 2019, 38, 405, PMID: 31519199, FI: 5.646, Original

Plaza PI, **MARTINEZ-LOPEZ E**, Lambertucci SA.

The perfect threat: Pesticides and vultures.

*Science of the Total Environment*, 2019, 687, 1207-1218, PMID: 31412456, FI: 5.589, Revisión

Pedrazzani R, Bertanza G, Brnardic I, ..., **GARCIA-FERNANDEZ AJ\*** et al.

Opinion paper about organic trace pollutants in wastewater: Toxicity assessment in a European perspective.

*Science of the Total Environment*, 2019, 651, 3202-3221, PMID: 30463169, FI: 5.589, Revisión

Kolbe I, **CARRASCO-BENSO MP, LOPEZ-MINGUEZ J, ..., GARAULET M\***.

Circadian period of luciferase expression shortens with age in human mature adipocytes from obese patients.

*Faseb Journal*, 2019, 33, 175-180, PMID: 29965796, FI: 5.391, Original

**ALARCON-VILA C, PIZZUTO M, PELEGRIN P\***.

Purinergic receptors and the inflammatory response mediated by lipids.

*Current Opinion in Pharmacology*, 2019, 47, 90-96, PMID: 30952060, FI: 5.203, Original

**MARTINEZ-LOPEZ E\***, Penalver J, Escrina A, ..., **GARCIA-FERNANDEZ AJ**.

Trace metals in striped dolphins (*Stenella coeruleoalba*) stranded along the Murcia coastline, Mediterranean Sea, during the period 2009-2015.

*Chemosphere*, 2019, 229, 580-588, PMID: 31100629, FI: 5.108, Original

**GOMEZ-RAMIREZ P**, Perez-Garcia JM, Leon-Ortega M, ..., **GARCIA-FERNANDEZ AJ**.

Spatiotemporal variations of organochlorine pesticides in an apex predator: Influence of government regulations and farming practices.

*Environmental Research*, 2019, 176, 108543, PMID: 31260915, FI: 5.026, Original

Di Marzio A, Lambertucci SA, **FERNANDEZ AJG**, **MARTINEZ-LOPEZ E\***.

From Mexico to the Beagle Channel: A review of metal and metalloid pollution studies on wildlife species in Latin America.

*Environmental Research*, 2019, 176, 108462, PMID: 31228806, FI: 5.026, Revisión

Sanchez-Virosta P, **ESPIN S**, Ruiz S et al.

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## AREA 4: NEUROSCIENCES AND SENSE ORGANS

There are eleven principal investigators (level R3 and R4, 51% female) and eighty R1 and R2 researchers working in the Area 4 of the IMIB.

Under the auspices of these groups, 4 doctoral thesis have been defended (3 with international mention) and 48 indexed articles have been published, out of these 9 were reviews. In this area the main categories for publishing are Neuroscience, Biology and Biochemistry, and Clinical Medicine.

In terms of competitive funding, 1 international, 14 national and 3 regional projects were active in 2019. In addition, one of the groups is Group of Excellence by the Seneca Foundation.

The research groups within this Area share the same main goal: to study the pathologies that affect the central nervous system.

The Cellular and Molecular Pharmacology Group, led by Dr. María Victoria Milanés Maquilón, studies the molecular and cellular mechanisms involved in opiate and cocaine dependence, and the reward mechanisms underlying addiction.

The Brain Regionalisation and Development Genes Group, led by Dr. Luis Puelles López, studies the genetic/molecular control of brain regionalisation during development, comparing different species of vertebrates. In this group they are also investigating the link between exercise and neuronal survival

The Experimental Ophthalmology Group, led by Dr. Manuel Vidal-Sanz, focuses on the mechanisms underlying retinal degeneration and its neuroprotection, using animal models of glaucoma, neuroinflammation, axonal or ischemic damage, as well as acquired or hereditary photoreceptor degeneration.

For its part, the Clinical and Experimental Neuroscience Group, led by Dr. María Trinidad Herrero Ezquerro, works in the search for markers of Parkinson's and Alzheimer's diseases as well as in the epidemiology and development of therapeutic strategies for neurological diseases. The Psychobiology and Behavioural Neurobiology Group, led by Dr. José María Martínez Selva, tries to understand the effect of genetic and environmental factors on different diseases and the characteristics of sleep.

The Aging Brain and Dementia Group, led by Dr. Miroljub Popovic Popovic, works on

the neurobiology of memory and emotions in young and aged subjects and patients with neurodegenerative diseases. They also investigate the syndrome of fetal alcoholism and are dwelling on the search for genes involved in behavior.

The Neurointervention Group, led by Dr. Mariano Espinosa de Rueda Ruiz, studies the benefits of thrombectomy and vascular recanalization techniques on the central nervous system.

The Cholinergic neuropathology group, led by Dr. Francisco J. Campoy Menéndez tackles the relationship between the cholinergic system, inflammation, the nervous system and systemic metabolism.

And finally, the Technological Innovation Group against Blindness, led by Dr. Fernando Vargas Martín, develops optoelectrical aids to improve visual acuity loss.

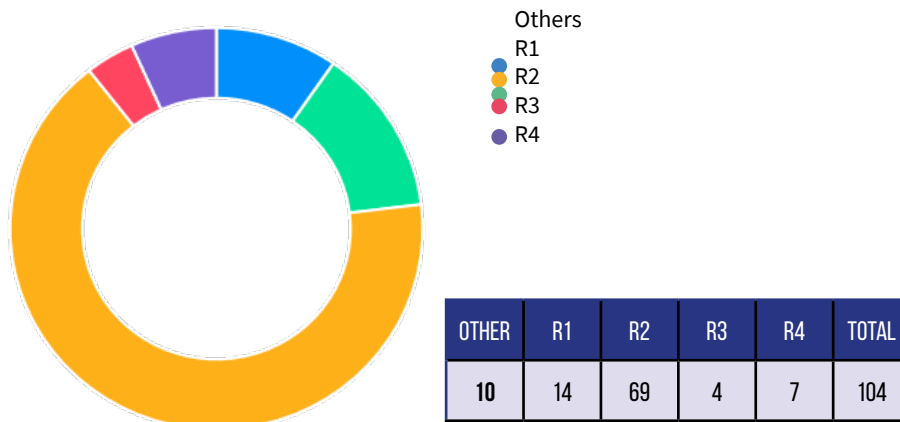
Area 4 has 9 groups:

- › Experimental Ophthalmology
- › Cell and Molecular Pharmacology
- › Brain Regionalization and Developmental Genes
- › Neuropathologies of the Cholinergic System
- › Clinical and Experimental Neuroscience
- › Psychobiology and Neurobiology of Behavior
- › Brain Aging and Dementia
- › Laboratory of Technological Innovation for Blindness
- › Neurointerventionism



COORDINATOR OF AREA 4  
DR. MARTA AGUDO BARRIUSO

These groups have a total of 104 researchers:



Research classification (Euraxess)

Selected publications based on the leadership of researchers and the last author or author of correspondence (marked with an asterisk) and ordered by the impact factor of the journal:

**VALDOR R\*, GARCIA-BERNAL D, RIQUELME D et al.**

Glioblastoma ablates pericytes antitumor immune function through aberrant up-regulation of chaperone-mediated autophagy.

*Proceedings of the National Academy of Sciences of the United States of America*, 2019, 116, 20655-20665, PMID: 31548426, FI: 9.58, Original

**MOLINA ML, GARCIA-BERNAL D, Martinez S, VALDOR R\*.**

Autophagy in the Immunosuppressive Perivascular Microenvironment of Glioblastoma.

*Cancers*, 2019, 12, PMID: 31906065, FI: 6.162, Revisión

**GUERRERO-BAUTISTA R, DO COUTO BR, HIDALGO JM, ..., MILANES MV\*.**

Modulation of stress- and cocaine prime-induced reinstatement of conditioned place preference after memory extinction through dopamine D3 receptor.

*Progress in Neuro-Psychopharmacology & Biological Psychiatry*, 2019, 92, 308-320, PMID: 30707990, FI: 4.315, Original

**VIDAL-VILLEGAS B, DI PIERDOMENICO J, MIRALLES DE IMPERIAL-OLLERO JA, ..., VIDAL-SANZ M\*.**

Melanopsin(+)RGCs Are fully Resistant to NMDA-Induced Excitotoxicity.

*International Journal of Molecular Sciences*, 2019, 20, PMID: 31226772, FI: 4.183, Original

**LUCAS-RUIZ F\*, GALINDO-ROMERO C, RODRIGUEZ-RAMIREZ KT, ..., AGUDO-BARRIUSO M\*.**

Neuronal Death in the Contralateral Un-Injured Retina after Unilateral Axotomy: Role of Microglial Cells.

*International Journal of Molecular Sciences*, 2019, 20, PMID: 31731684, FI: 4.183, Original

List of remaining publications in the area during 2019 ordered by impact factor (at least the first author affiliated to the IMIB is identified in bold. In addition an asterisk indicates if the last or corresponding author is affiliated to the IMIB. A # identifies publications of researchers recently affiliated to the IMIB and whose 2019 production comes from their previous research centers):

# Kuznetsova VA, Mates-Torres E, Prochukhan N, ..., **MARTINEZ-CARMONA M** et al.  
Effect of Chiral Ligand Concentration and Binding Mode on Chiroptical Activity of CdSe/CdS Quantum Dots.  
*Acs Nano*, 2019, 13, 13560-13572, PMID: 31697474, FI: 13.903, Original

Gonzalez Garcia A, Moniche F, Escudero-Martinez I, ..., **ZAMARRO J** et al.  
Clinical Predictors of Hyperperfusion Syndrome Following Carotid Stenting: Results From a National Prospective Multicenter Study.  
*Jacc-Cardiovascular Interventions*, 2019, 12, 873-882, PMID: 31072509, FI: 9.544, Original

# **MARTINEZ-CARMONA M**, Izquierdo-Barba I, Colilla M et al.  
Concanavalin A-targeted mesoporous silica nanoparticles for infection treatment.  
*Acta Biomaterialia*, 2019, 96, 547-556, PMID: 31279160, FI: 6.638, Original

**GARCIA-AYUSO D\***, **DI PIERDOMENICO J\***, **VIDAL-SANZ M\***, **VILLEGAS-PEREZ MP\***.  
Retinal Ganglion Cell Death as a Late Remodeling Effect of Photoreceptor Degeneration.  
*International Journal of Molecular Sciences*, 2019, 20, PMID: 31546829, FI: 4.183, Revisión

Blanco R, Martinez-Navarrete G, Perez-Rico C, **VALIENTE-SORIANO FJ** et al.  
A Chronic Ocular-Hypertensive Rat Model induced by Injection of the Sclerosant Agent Polidocanol in the Aqueous Humor Outflow Pathway.  
*International Journal of Molecular Sciences*, 2019, 20, PMID: 31261943, FI: 4.183, Original

Lax P, Ortuno-Lizaran I, Maneu V, **VIDAL-SANZ M** et al.  
Photosensitive Melanopsin-Containing Retinal Ganglion Cells in Health and Disease: Implications for Circadian Rhythms.  
*International Journal of Molecular Sciences*, 2019, 20, PMID: 31261700, FI: 4.183, Revisión

Schramm P, Navia P, Papa R, **ZAMARRO J** et al.  
ADAPT technique with ACE68 and ACE64 reperfusion catheters in ischemic stroke treatment: results from the PROMISE study.  
*Journal of Neurointerventional Surgery*, 2019, 11, 226-231, PMID: 30061367, FI: 3.925, Original

**LUCAS-RUIZ F**, Galindo-Romero C, Salinas-Navarro M, ..., **AGUDO BARRIUSO M\***.  
Systemic and Intravitreal Antagonism of the TNFR1 Signaling Pathway Delays Axotomy-Induced Retinal Ganglion Cell Loss.  
*Frontiers in Neuroscience*, 2019, 13, 1096, PMID: 31680831, FI: 3.648, Original

**NAVARRO-ZARAGOZA J\***, Ros-Simo C, **MILANES MV, ..., LAORDEN ML.**

Binge ethanol and MDMA combination exacerbates HSP27 and Trx-1 (biomarkers of toxic cardiac effects) expression in right ventricle.

*Life Sciences*, 2019, 220, 50-57, PMID: 30708098, FI: 3.448, Original

Blanco-Gandia MC, Montagud-Romero S, **NAVARRO-ZARAGOZA J** et al.

Pharmacological modulation of the behavioral effects of social defeat in memory and learning in male mice.

*Psychopharmacology*, 2019, 236, 2797-2810, PMID: 31049607, FI: 3.424, Original

**MADRID-VALERO JJ\***, **ORDONANA JR**, Klump KL et al.

Children Sleep and Antisocial Behavior: Differential Association of Sleep with Aggression and Rule-Breaking.

*Journal of Abnormal Child Psychology*, 2019, 47, 791-799, PMID: 30280364, FI: 3.406, Original

**GIL-MARTINEZ AL, ESTRADA C, CUENCA L, ..., HERRERO MT\***.

Local Gastrointestinal Injury Exacerbates Inflammation and Dopaminergic Cell Death in Parkinsonian Mice.

*Neurotoxicity Research*, 2019, 35, 918-930, PMID: 30796691, FI: 3.311, Original

**PUELLES L\***, **ALONSO A**, Garcia-Calero E, **MARTINEZ-DE-LA-TORRE M.**

Concentric ring topology of mammalian cortical sectors and relevance for patterning studies.

*Journal of Comparative Neurology*, 2019, 527, 1731-1752, PMID: 30737959, FI: 3.239, Revisión

Carvalho-E-Silva APMC, Harmer AR, Pinheiro MB, **MADRID-VALERO JJ** et al.

Does the heritability of chronic low back pain depend on how the condition is assessed?

*European Journal of Pain*, 2019, 23, 1712-1722, PMID: 31243863, FI: 3.188, Original

Perez de Lara MJ, **AVILES-TRIGUEROS M**, Guzman-Aranguez A, ..., **VIDAL-SANZ M\*** et al.

Potential role of P2X7 receptor in neurodegenerative processes in a murine model of glaucoma.

*Brain Research Bulletin*, 2019, 150, 61-74, PMID: 31102752, FI: 3.103, Original

**GARCIA-AYUSO D\***, **DI PIERDOMENICO J**, **VALIENTE-SORIANO FJ, ..., VILLEGAS-PEREZ MP\***.

beta-alanine supplementation induces taurine depletion and causes alterations of the retinal nerve fiber layer and axonal transport by retinal ganglion cells.

*Experimental eye Research*, 2019, 188, 107781, PMID: 31473259, FI: 2.998, Original

Rovere G, **NADAL-NICOLAS FM**, **SOBRADO-CALVO P, ..., VIDAL-SANZ M\*, AGUDO-BARRIUO M\***.

Topical bromfenac transiently delays axotomy-induced retinal ganglion cell loss.

*Experimental eye Research*, 2019, 182, 156-159, PMID: 30940447, FI: 2.998, Original

Fernandez-Lopez L, **LUNA-MALDONADO A, FALCON M\*** et al.

Development and validation of a gas chromatography-mass spectrometry method for opiates and cocaine in human bone.

*Journal of Pharmaceutical and Biomedical Analysis*, 2019, 164, 636-641, PMID: 30471636, FI: 2.983, Original

**PUELLES L\***.

Survey of Midbrain, Diencephalon, and Hypothalamus Neuroanatomic Terms Whose Prosomeric Definition Conflicts With Columnar Tradition.

*Frontiers in Neuroanatomy*, 2019, 13, 20, PMID: 30873012, FI: 2.923, Revisión

Watson C, Bartholomaeus C, **PUELLES L**.

Time for Radical Changes in Brain Stem Nomenclature-Appling the Lessons From Developmental Gene Patterns.

*Frontiers in Neuroanatomy*, 2019, 13, 10, PMID: 30809133, FI: 2.923, Original

**ESTRADA C, CUENCA L, CANO-FERNANDEZ L, ..., HERRERO MT\***.

Voluntary exercise reduces plasma cortisol levels and improves transitory memory impairment in young and aged Octodon degus.

*Behavioural Brain Research*, 2019, 373, 112066, PMID: 31269420, FI: 2.77, Original

**GARCIA-PEREZ D\***, Ferenczi S, Kovacs KJ, **MILANES MV**.

Distinct regulation pattern of Egr-1, BDNF and Arc during morphine-withdrawal conditioned place aversion paradigm: Role of glucocorticoids.

*Behavioural Brain Research*, 2019, 360, 244-254, PMID: 30550948, FI: 2.77, Original

Coyle PK, Khatri B, Edwards KR, **MECA-LALLANA JE\*** et al.

Teriflunomide real-world evidence: Global differences in the phase 4 Teri-PRO study.

*Multiple Sclerosis and Related Disorders*, 2019, 31, 157-164, PMID: 31005729, FI: 2.725, Original

**MARTINEZ-SELVA JM**, Munoz MA, **SANCHEZ-NAVARRO JP** et al.

Time Course of the Neural Activity Related to Behavioral Decision-Making as Revealed by Event-Related Potentials.

*Frontiers in Behavioral Neuroscience*, 2019, 13, 191, PMID: 31551726, FI: 2.622, Original

**LUCAS-RUIZ F, GALINDO-ROMERO C, GARCIA-BERNAL D, ..., AGUDO-BARRIUSO M\***.

Mesenchymal stromal cell therapy for damaged retinal ganglion cells, is gold all that glitters?

*Neural Regeneration Research*, 2019, 14, 1851-1857, PMID: 31290434, FI: 2.472, Revisión

Ribo M, Requena M, Macho J, **ZAMARRO J** et al.

Mechanical thrombectomy with a novel stent retriever with multifunctional zones: Initial clinical experience with the NeVa thrombectomy device.

*Journal of Neuroradiology*, 2019, S0150-9861(18)30444-9 [pii], PMID: 30951765, FI: 2.467, Original

**VALIENTE-SORIANO FJ\*, ORTIN-MARTINEZ A, DI PIERDOMENICO J, ..., VIDAL-SANZ M\*.**

Topical Brimonidine or Intravitreal BDNF, CNTF, or bFGF Protect Cones Against Phototoxicity.  
*Translational Vision Science & Technology*, 2019, 8, 36, PMID: 31890348, FI: 2.399, Original

Kosonogov V, **MARTINEZ-SELVA JM, CARRILLO-VERDEJO E, ..., SANCHEZ-NAVARRO JP.**

Effects of social and affective content on exogenous attention as revealed by event-related potentials.

*Cognition & Emotion*, 2019, 33, 683-695, PMID: 29909740, FI: 2.37, Original

Martin-Nieto J, Uribe ML, Esteve-Rudd J, **HERRERO MT** et al.

A role for DJ-1 against oxidative stress in the mammalian retina.

*Neuroscience Letters*, 2019, 708, 134361, PMID: 31276729, FI: 2.173, Original

Carreon Guarnizo E, Hernandez Clares R, Castillo Trivino T, ..., **MECA LALLANA JE.**

Experience with tocilizumab in patients with neuromyelitis optica spectrum disorders.

*Neurologia*, 2019, S0213-4853(19)30033-7 [pii], PMID: 30928236, FI: 2.038, Original

B Amorim A, Simic M, Pappas E, ..., **CARRILLO E** et al.

Is occupational or leisure physical activity associated with low back pain? Insights from a cross-sectional study of 1059 participants.

*Brazilian Journal of Physical Therapy*, 2019, 23, 257-265, PMID: 31130170, FI: 1.879, Original

Kosonogov V, **MARTINEZ-SELVA JM, TORRENTE G, ..., SANCHEZ-NAVARRO JP.**

Head Motion Elicited by Viewing Affective Pictures as Measured by a New LED-Based Technique.

*Multisensory Research*, 2019, , 1-14, PMID: 31117047, FI: 1.829, Original

**CUENCA L, GIL-MARTINEZ AL, CANO-FERNANDEZ L, ..., HERRERO MT\*.**

Parkinson's disease: a short story of 200 years.

*Histology and Histopathology*, 2019, 34, 573-591, PMID: 30540129, FI: 1.777, Revisión

Herrera E, **AGUDO-BARRIUOSO M**, Murcia-Belmonte V.

Cranial Pair II: The Optic Nerves.

*Anatomical Record-Advances in Integrative Anatomy and Evolutionary Biology*, 2019, 302, 428-445, PMID: 30306726, FI: 1.329, Original

**FERRAN JL\*, PUELLES L.**

Lessons from Amphioxus Bauplan About Origin of Cranial Nerves of Vertebrates That Innervates Extrinsic Eye Muscles.

*Anatomical Record-Advances in Integrative Anatomy and Evolutionary Biology*, 2019, 302, 452-462, PMID: 29659196, FI: 1.329, Original



Diaz C, **PUELLES L.**

Segmental Analysis of the Vestibular Nerve and the Efferents of the Vestibular Complex.  
*Anatomical Record-Advances in Integrative Anatomy and Evolutionary Biology*, 2019, 302, 472-484, PMID: 29698581, FI: 1.329, Original

**PUELLES L\***, Tvrđik P, **MARTINEZ-DE-LA-TORRE M.**

The Postmigratory Alar Topography of Visceral Cranial Nerve Efferents Challenges the Classical Model of Hindbrain Columns.

*Anatomical Record-Advances in Integrative Anatomy and Evolutionary Biology*, 2019, 302, 485-504, PMID: 29663708, FI: 1.329, Original

**ORDONANA JR\***, **CARRILLO E**, **COLODRO-CONDE L, ..., SANCHEZ-ROMERA JF.**

An Update of Twin Research in Spain: The Murcia Twin Registry.  
*Twin Research and Human Genetics*, 2019, 22, 667-671, PMID: 31500683, FI: 1.159, Original

Silventoinen K, Jelenkovic A, Yokoyama Y, ..., **ORDONANA JR** et al.

The CODATwins Project: The Current Status and Recent Findings of Collaborative Project of Development of Anthropometrical Measures in Twins.

*Twin Research and Human Genetics*, 2019, 22, 800-808, PMID: 31364586, FI: 1.159, Original

**SANCHEZ ROMERA JF\***, Garcia Zafra MV, Arraez Monllor M et al.

[Home enteral nutrition in patients with neurological disease in an area of the southeast of Spain].

*Nutricion Hospitalaria*, 2019, 36, 1019-1026, PMID: 31516008, FI: 0.759, Original

Fernandez O, Tintore M, Saiz A, ..., **MECA-LALLANA JE** et al.

[Review of the novelties presented at the 2018 ECTRIMS Congress: 11th Post-ECTRIMS Meeting (I)].

*Revista de Neurologia*, 2019, 68, 431-441, PMID: 31070235, FI: 0.485, Revisión

Fernandez O, Tintore M, Saiz A, ..., **MECA-LALLANA JE** et al.

Review of the novelties presented at the 2018 ECTRIMS Congress: 11th Post-ECTRIMS Meeting (II).

*Revista de Neurologia*, 2019, 68, 468-479, PMID: 31132136, FI: 0.485, Revisión

# AREA 5: EPIDEMIOLOGY, PUBLIC HEALTH AND HEALTH SERVICES

The Area V of the IMIB (“Epidemiology, Public Health and Health Services”) comprises a total of 7 research groups from diverse institutions including the University of Murcia, the University Clinical Hospital “Virgen de la Arrixaca”, Primary Care, and the General Directorate of Public Health of the Region of Murcia. The Area benefits from the multidisciplinary nature of groups and research profiles, and has a large and consolidated research trajectory on the main health problems of the population, such as cancer and other chronic diseases, endocrine disruptors and reproductive health, environmental pollutants, or mental health.

The personnel of the Area add up to 124 researchers, including 11 principal investigators. The scientific profiles encompass specialists in preventive medicine and public health, general practitioners, nurses, biologists, physiotherapists, statisticians, and psychiatrists, among others.

With a total of 116 publications throughout 2019, the Area has one of the largest scientific production and cumulative impact factor of the IMIB. Of these papers, 37.2% were published in Q1 journals and 30.0% in D1 journals. Regardless of its large production, this represents a net increase with respect to the previous year in number of publications ( $\approx 3.5\%$  increase), despite a slight reduction ( $\approx 4.3\%$ ) in overall impact factor as compared to the last 5 years). This reduction, however, is a consequence of the extraordinary impact factor of the last two years, as it is remarkable that the Area’s 2019 impact factor was still the second largest of the Institute. Some of the most relevant publications of the Area during 2019 include top journals such as Nature, JAMA Psychiatry, Circulation, Nature Genetics, Diabetes Care, Gut, or Journal of the National Cancer Institute.

The Area participates in 17 research projects with active funding (9 regional, 5 national and 3 international), plus several other large scale projects and consortia in which different groups take leadership roles or make significant scientific contributions, such as the European Prospective Investigation into Cancer and Nutrition (EPIC), the Multi-Case Control study (MCC-Spain), the NCD-Risk Factor Collaboration (NCD-RisC), the GenRisk study, or the CORDELIA cardiovascular consortium. The collaboration in national and international research initiatives is nuclear to the scientific activity of the Area, with participation in excellence networks, such as the CIBER in Epidemiology and Public Health (CIBERESP), the European Network of Cancer Registries (ENCR), the Spanish Network of Cancer Registries (REDECAN), EURO CARE-5, or the World Mental Health Surveys, among others.

Furthermore, the Area carries out an intense teaching activity of grade, Master, and Doctorate levels, as well as training of different health specialists, with a total of 4 Doctoral The-

ses succesfully defended during 2019.

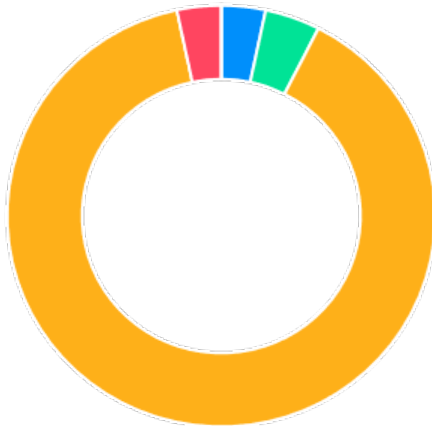
Area 5 has 7 groups:

- › Research in Epidemiology and Public Health
- › Research Methodology in Health Siences
- › Pediatric Environmental Health
- › Physiotherapy and Disability
- › Legal and Forensic Medicine. Health Legistation
- › Research in Primary Care
- › Advanced Nursing Care



COORDINATOR OF AREA 5  
DR. Mª DOLORES CHIRLAQUE LÓPEZ

These groups have a total of 120 researchers:



- Others
- R1
- R2
- R3
- R4

| OTHER | R1 | R2  | R3 | R4 | TOTAL |
|-------|----|-----|----|----|-------|
| 4     | 5  | 107 | 4  | 0  | 120   |

Research classification (Euraxess)

Selected publications based on the leadership of researchers and the last author or author of correspondence (marked with an asterisk) and ordered by the impact factor of the journal:

Martin-San Agustin R, **GARCIA-VIDAL JA\***, Canovas-Ambit G, ..., **MEDINA-MIRAPEIX F\***.  
Validity and Reliability of a New Optoelectronic System for Measuring Active Range of Motion of Upper Limb Joints in Asymptomatic and Symptomatic Subjects.  
*JournalofClinical Medicine*, 2019, 8, PMID: 31684077, FI: 5.688, Original

**GARCIA-VIDAL JA\***, Lopez-Nicolas M, Sanchez-Sobrado AC, ..., **BERNABEU-MORA R\***.  
The Combination of Different Ergonomic Supports during Dental Procedures Reduces the Muscle Activity of the Neck and Shoulder.  
*Journal of Clinical Medicine*, 2019, 8, PMID: 31443308, FI: 5.688, Original

**MEDINA-MIRAPEIX F\***, **BERNABEU-MORA R\***, **SANCHEZ-MARTINEZ MP**, ..., **MONTILLA-HERRADOR J\***.  
Patterns and Predictors of Recovery from Poor Health Status Measured with the Chronic Obstructive Pulmonary Disease (COPD) Assessment Test in Patients with Stable COPD: A Longitudinal Study.  
*JournalofClinical Medicine*, 2019, 8, PMID: 31261894, FI: 5.688, Original

Lillo-Navarro C, **MONTILLA-HERRADOR J\***, **ESCOLAR-REINA P**, ..., **MEDINA-MIRAPEIX F\***.  
Factors Associated with Parents' Adherence to Different Types of Exercises in Home Programs for Children with Disabilities.  
*JournalofClinical Medicine*, 2019, 8, PMID: 30959749, FI: 5.688, Original

Dominguez-Morueco N, Ratola N, Sierra J, ..., **JIMENEZ-GUERRERO P\***.  
Combining monitoring and modelling approaches for BaP characterization over a petrochemical area.  
*Science of the Total Environment*, 2019, 658, 424-438, PMID: 30579200, FI: 5.589, Original

List of remaining publications in the area during 2019 ordered by impact factor (at least the first author affiliated to the IMIB is identified in bold. In addition an asterisk indicates if the last or corresponding author is affiliated to the IMIB. A # identifies publications of researchers recently affiliated to the IMIB and whose 2019 production comes from their previous research centers):

NCD Risk Factor Collaboration (NCD-RisC) COLABORADORES: Bixby H, Bentham J, Zhou B, ..., **CHIRLAQUE MD** et al.  
Rising rural body-mass index is the main driver of the global obesity epidemic in adults.  
*Nature*, 2019, 569, 260-264, PMID: 31068725, FI: 43.07, Original

Huyghe JR, Bien SA, Harrison TA, ..., **CHIRLAQUE MD** et al.  
Discovery of common and rare genetic risk variants for colorectal cancer.  
*Nature Genetics*, 2019, 51, 76-87, PMID: 30510241, FI: 25.455, Original

Key TJ, Appleby PN, Bradbury KE, ..., **HUERTA JM** et al.  
Consumption of Meat, Fish, Dairy Products, and Eggs and Risk of Ischemic Heart Disease.  
*Circulation*, 2019, 139, 2835-2845, PMID: 31006335, FI: 23.054, Original

Mullee A, Romaguera D, Pearson-Stuttard J, ..., **CIRERA L** et al.  
Association Between Soft Drink Consumption and Mortality in 10 European Countries.  
*Jama Internal Medicine*, 2019, 10.1001/jamainternmed.2019.2478 [doi], PMID: 31479109, FI: 20.768, Original

Smith T, Muller DC, Moons KGM, ..., **HUERTA JM** et al.  
Comparison of prognostic models to predict the occurrence of colorectal cancer in asymptomatic individuals: a systematic literature review and external validation in the EPIC and UK Biobank prospective cohort studies.  
*Gut*, 2019, 68, 672-683, PMID: 29615487, FI: 17.943, Revisión

Degenhardt L, Bharat C, Glantz MD, ..., **NAVARRO-MATEU F** et al.  
Association of Cohort and Individual Substance Use With Risk of Transitioning to Drug Use, Drug Use Disorder, and Remission From Disorder: Findings From the World Mental Health Surveys.  
*Jama Psychiatry*, 2019, 76, 708-720, PMID: 30865282, FI: 15.916, Original

Vissers LET, Sluijs I, van der Schouw YT, ..., **CHIRLAQUE MD** et al.  
Dairy Product Intake and Risk of Type 2 Diabetes in EPIC-InterAct: A Mendelian Randomization Study.  
*Diabetes Care*, 2019, 42, 568-575, PMID: 30728219, FI: 15.27, Original

Smith Byrne K, Appleby PN, Key TJ, ..., **CHIRLAQUE MD** et al.  
The role of plasma microseminoprotein-beta in prostate cancer: an observational nested case-control and Mendelian randomization study in the European prospective investigation into cancer and nutrition.  
*Annals of Oncology*, 2019, 30, 983-989, PMID: 31089709, FI: 14.196, Original

Schmit SL, Edlund CK, Schumacher FR, ..., **HUERTA JM** et al.  
Novel Common Genetic Susceptibility Loci for Colorectal Cancer.  
*Jnci-Journal of the National Cancer Institute*, 2019, 111, 146-157, PMID: 29917119, FI: 10.211, Original

His M, Viallon V, Dossus L, ..., **HUERTA JM** et al.  
Prospective analysis of circulating metabolites and breast cancer in EPIC.  
*Bmc Medicine*, 2019, 17, 178, PMID: 31547832, FI: 8.285, Original

de Vries YA, Al-Hamzawi A, Alonso J, ..., **NAVARRO-MATEU F** et al.  
Childhood generalized specific phobia as an early marker of internalizing psychopathology across the lifespan: results from the World Mental Health Surveys.  
*Bmc Medicine*, 2019, 17, 101, PMID: 31122269, FI: 8.285, Original

Karavasiloglou N, Husing A, Masala G, ..., **CHIRLAQUE LOPEZ MD** et al.  
Adherence to the World Cancer Research Fund/American Institute for Cancer Research cancer prevention recommendations and risk of in situ breast cancer in the European Prospective Investigation into Cancer and Nutrition (EPIC) cohort.  
*Bmc Medicine*, 2019, 17, 221, PMID: 31787099, FI: 8.285, Original

Murphy N, Ward HA, Jenab M, ..., **HUERTA JM** et al.  
Heterogeneity of Colorectal Cancer Risk Factors by Anatomical Subsite in 10 European Countries: A Multinational Cohort Study.  
*Clinical Gastroenterology and Hepatology*, 2019, 17, 1323-1331.e6, PMID: 30056182, FI: 7.958, Original

Cano-Sancho G, Ploteau S, Matta K, **ADOAMNEI E** et al.  
Human epidemiological evidence about the associations between exposure to organochlorine chemicals and endometriosis: Systematic review and meta-analysis.  
*Environment International*, 2019, 123, 209-223, PMID: 30530163, FI: 7.943, Revisión

NCD Risk Factor Collaboration COLABORADORES: Taddei C, Jackson R, Zhou B, ..., **CHIRLAQUE MD** et al.  
National trends in total cholesterol obscure heterogeneous changes in HDL and non-HDL cholesterol and total-to-HDL cholesterol ratio: a pooled analysis of 458 population-based studies in Asian and Western countries.  
*International Journal of Epidemiology*, 2019, dyz099 [pii], PMID: 31321439, FI: 7.339, Original

Dam V, van der Schouw YT, Onland-Moret NC, ..., **CHIRLAQUE MD** et al.  
Association of menopausal characteristics and risk of coronary heart disease: a pan-European case-cohort analysis.  
*International Journal of Epidemiology*, 2019, 48, 1275-1285, PMID: 30796459, FI: 7.339, Original

Gallo V, Vineis P, Cancellieri M, ..., **GAVRILA D** et al.  
Exploring causality of the association between smoking and Parkinson's disease.  
*International Journal of Epidemiology*, 2019, 48, 912-925, PMID: 30462234, FI: 7.339, Original

Degenhardt L, Bharat C, Bruno R, ..., **NAVARRO-MATEU F** et al.  
Concordance between the diagnostic guidelines for alcohol and cannabis use disorders in the draft ICD-11 and other classification systems: analysis of data from the WHO's World Mental Health Surveys.  
*Addiction*, 2019, 114, 534-552, PMID: 30370636, FI: 6.851, Original

Harris MG, Bharat C, Glantz MD, ..., **NAVARRO-MATEU F** et al.  
Cross-national patterns of substance use disorder treatment and associations with mental disorder comorbidity in the WHO World Mental Health Surveys.  
*Addiction*, 2019, 114, 1446-1459, PMID: 30835879, FI: 6.851, Original

Naudin S, Viallon V, Hashim D, ..., **CHIRLAQUE LOPEZ MD** et al.  
Healthy lifestyle and the risk of pancreatic cancer in the EPIC study.  
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[Associations between dietary inflammatory index and male reproductive parameters].  
*Revista Internacional de Andrologia*, 2019, 17, 79-87, PMID: 31326042, FI: 0.294, Original

**ADOAMNEI E, MENDIOLA J\*, MONINO-GARCIA M, ..., TORRES-CANTERO AM.**

[Dietary intake of trace elements and semen quality and reproductive hormone levels in young men: relationship with fertility].

*Revista Internacional de Andrología*, 2019, 17, 46-54, PMID: 31029437, FI: 0.294, Original

Oñate-Celdrán J, Areñese-González JJ, **MENDIOLA J, ..., TORRES-CANTERO AM.**

[Study of anogenital distance as a diagnostic tool for prostate cancer].

*Revista Internacional de Andrología*, 2019, 17, 60-67, PMID: 31029439, FI: 0.294, Original

# AREA 6: IMMUNOLOGY, MICROBIOLOGY AND INFECTIOUS DISEASES

IMIB Area 6 consists of six research groups involved in the study of the clinical and basic aspects of the immune and inflammatory response, infection, cancer, cell therapy and transplantation of hematopoietic progenitor cells.

The group of Dr. Alfredo Minguela (Immunology and immunotolerance in transplantation and immune-based diseases, HCUVA) investigates the regulatory mechanisms of the immune response that, because of excess or defect, causes the development of pathologies with an important impact in healthcare (transplantation, cancer, infections, inflammatory diseases, immunodeficiencies, and pathology of reproduction). Some researchers in this group study non-infectious complications associated to HIV (cardiovascular, metabolic, neurocognitive, bone and kidney events) and their relationship to the immune response. Dr. Victor Mulero's group (Immunity, Inflammation and Cancer, UMU) studies in depth the molecular aspects and the role of cytokines and TLRs in inflammation, hematopoiesis, angiogenesis and pathologies such as psoriasis, cancer. The group also uses zebrafish as a model of pre-clinical studies.

The group of Dr. José M. Moraleda (Hematopoietic transplant and cell therapy, HCUVA) develops pre-clinical studies and clinical trials in cell therapy using hematopoietic progenitors, mesenchymal stem cells or amniotic membrane in a wide variety of pathologies and hematological conditions. The groups of Infectious Pathology and Clinical Microbiology and Tropical Medicine have been revised during 2019 and are in a process of merging, being both of them coordinated by Dr. Genoveva Yagüe (Microbiology, Infectious Pathology and Tropical Medicine, HCUVA) and investigates the molecular bases of antimicrobials resistance, lipidomics of bacteria, diseases caused by tripanosoma and Leishmania, biomarkers, clinical parameters that improve clinical results, optimization of antibiotic treatments, prevention of nosocomial infections and the "syndromic" approach of patients with infections. The group of Dr. Pilar García-Peñarrubia (Innate immunity in health and disease, UMU) studies basic aspects of endometriosis, liver cirrhosis and candidiasis, designing mathematical models of immune response, synthesis and biological activity of new anti-inflammatory drugs and the inhibitory role of CD33 and MHC-I receptors in cellular cytotoxicity.

Overall, the 6 groups have 145 researchers (46 principal investigators and / or responsible of clinical trials, 65 collaborating researchers, 6 postdoctoral fellows, 12 researchers in training and 4 technicians, that during the past five years have participated in 32 research projects (9 international, 20 national and 3 regional) , 154 clinical trials and established 168 private collaborations. The research activity of the groups has generated a total of 79 publications (44 in the first quartile, 55.7%) with a cumulative total impact of 435. In addition, nine doctoral theses have been defended and one patent generated.

Of all the articles published by our groups we can highlight: 1) the publication of Dr. Mulero in Immunity. (PMID: 31174991) where he reviews the role of the inflammasome in hematoipoiesis; 2) the article of Dr. Minguela in Can Immunol Res (PMID: 31239317) where he reviews the role of activating molecules in the education of NK cells and their anti-tumor response; 3) the one published by Dr. Moraleda in Proc Natl Acad Sci USA. (PMID: 31548426), in which he analyzes the role of pericytes in immunovigilance against Neuroblastoma; 4) the article published by the group of Dr. García Peñarrubia in Front Immunol (PMID: 29483123), in which they analyze the role of the affinity of the interaction of the TCR with the peptide presented in MHC in the activation of the T lymphocytes using mathematical models; 5) that provided by Dr. Segovia in PLoS Negl Trop Dis (PMID: 31647811) in which international recommendations are defined for the diagnosis and treatment of congenital Chagas disease; and 6) and the article published by Dr. Martínez group in Int J Gynecol Cancer (PMID: 31420414) studying pertuzumab in patients with Her2 ovarian cancer low platinum resistant.

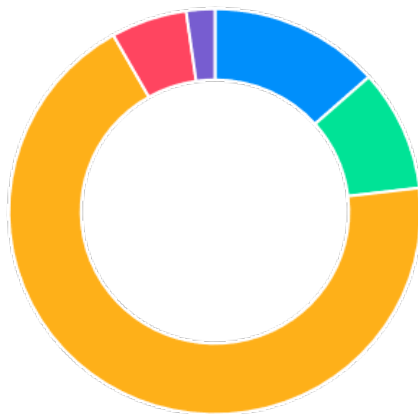
The area 6 has six groups:

- › Immunology and Immunotolerance in Transplants and Immunologically Based Diseases
- › Immunity, Inflammation and Cancer
- › Hematopoietic Microbiology and Tropical Medicine
- › Innate Immunity in Health and Disease
- › Infectious Pathology

These groups have a total of 134 researchers:



**COORDINATOR OF AREA 6  
DR. ALFREDO MINGUELA PURAS**



- Others
- R1
- R2
- R3
- R4

| OTHER | R1 | R2 | R3 | R4 | TOTAL |
|-------|----|----|----|----|-------|
| 18    | 13 | 92 | 8  | 3  | 134   |

Research classification (Euraxess)

Selected publications based on the leadership of researchers and the last author or author of correspondence (marked with an asterisk) and ordered by the impact factor of the journal:

**TYRKALSKA SD, PEREZ-OLIVA AB, RODRIGUEZ-RUIZ L, ..., MULERO V\*.**

Inflammasome Regulates Hematopoiesis through Cleavage of the Master Erythroid Transcription Factor GATA1.

*Immunity*, 2019, 51, 50-63.e5, PMID: 31174991, FI: 21.522, Original

**CARMONA-MARTINEZ V\*, RUIZ-ALCARAZ AJ, Vera M, ..., GARCIA-PENARRUBIA P\*.**

Therapeutic potential of pteridine derivatives: A comprehensive review.

*Medicinal Research Reviews*, 2019, 39, 461-516, PMID: 30341778, FI: 9.791, Revisión

**GUILLAMON CF, MARTINEZ-SANCHEZ MV, GIMENO L, ..., MINGUELA A\*.**

Activating KIRs on Educated NK Cells Support Downregulation of CD226 and Inefficient Tumor Immunosurveillance.

*Cancer Immunology Research*, 2019, 7, 1307-1317, PMID: 31239317, FI: 8.619, Original

**GIMENO L\*, MARTINEZ-BANACLOCHA H, BERNARDO MV, ..., MINGUELA A\*, CAMPILLO JA\*.**

NKG2D Polymorphism in Melanoma Patients from Southeastern Spain.

*Cancers*, 2019, 11, PMID: 30925758, FI: 6.162, Original

**LOPEZ-GARCIA S, Lozano A, GARCIA-BERNAL D, ..., RODRIGUEZ-LOZANO FJ\*.**

Biological Effects of New Hydraulic Materials on Human Periodontal Ligament Stem Cells.

*Journal of Clinical Medicine*, 2019, 8, PMID: 31416236, FI: 5.688, Original

List of remaining publications in the area during 2019 ordered by impact factor (at least the first author affiliated to the IMIB is identified in bold. In addition an asterisk indicates if the last or corresponding author is affiliated to the IMIB):

Andre F, Ciruelos E, Rubovszky G et al. COLABORADORES: Rubovszky G, Kaufman B, Yamashita T, ..., **ALONSO ROMERO JL** et al.

Alpelisib for PIK3CA-Mutated, Hormone Receptor-Positive Advanced Breast Cancer.

*New England Journal of Medicine*, 2019, 380, 1929-1940, PMID: 31091374, FI: 70.67, Original

Sanchez-Martinez D, Baroni ML, Gutierrez-Aguera F, ..., **FUSTER JL** et al.

Fratricide-resistant CD1a-specific CAR T cells for the treatment of cortical T-cell acute lymphoblastic leukemia.

*Blood*, 2019, 133, 2291-2304, PMID: 30796021, FI: 16.562, Original

Borisov S, Danila E, Maryandyshev A, ..., **BERNAL E** et al.

Surveillance of adverse events in the treatment of drug-resistant tuberculosis: first global report.

*European Respiratory Journal*, 2019, 54, PMID: 31601711, FI: 11.807, Original

Lopez-Millan B, Sanchez-Martinez D, Roca-Ho H, ..., **FUSTER JL** et al.  
NG2 antigen is a therapeutic target for MLL-rearranged B-cell acute lymphoblastic leukemia.  
*Leukemia*, 2019, 33, 1557-1569, PMID: 30635633, FI: 9.944, Original

Sepahi A, Kraus A, Casadei E, ..., **GALINDO-VILLEGAS J** et al.  
Olfactory sensory neurons mediate ultrarapid antiviral immune responses in a TrkA-dependent manner.  
*Proceedings of the National Academy of Sciences of the United States of America*, 2019, 116, 12428-12436, PMID: 31160464, FI: 9.58, Original

Perez AB, Vrancken B, Chueca N, ..., **BERNAL E** et al.  
Increasing importance of European lineages in seeding the hepatitis C virus subtype 1a epidemic in Spain.  
*Eurosurveillance*, 2019, 24, PMID: 30862327, FI: 7.421, Original

Gonzalez-Sanz R, Casas-Alba D, Launes C, ..., **MORENO-DOCON A** et al.  
Molecular epidemiology of an enterovirus A71 outbreak associated with severe neurological disease, Spain, 2016.  
*Eurosurveillance*, 2019, 24, PMID: 30782267, FI: 7.421, Original

Gonzalez-Sanz R, Taravillo I, Reina J, ..., **MORENO-DOCON A** et al.  
Enterovirus D68-associated respiratory and neurological illness in Spain, 2014-2018.  
*Emerging Microbes & Infections*, 2019, 8, 1438-1444, PMID: 31571527, FI: 6.212, Original

Alonso R, Cedena MT, Gomez-Grande A, ..., **MORALEDA JM** et al.  
Imaging and bone marrow assessments improve minimal residual disease prediction in multiple myeloma.  
*American Journal of Hematology*, 2019, 94, 853-861, PMID: 31074033, FI: 6.137, Original

Jimenez-Sousa MA, Jimenez JL, Fernandez-Rodriguez A, ..., **BERNAL-MORELL E** et al.  
VDR rs2228570 Polymorphism Is Related to Non-Progression to AIDS in Antiretroviral Therapy Naive HIV-Infected Patients.  
*Journal of Clinical Medicine*, 2019, 8, PMID: 30841566, FI: 5.688, Original

Rosado-Sanchez I, Rodriguez-Gallego E, Peraire J, ..., **BERNAL E** et al.  
Glutaminolysis and lipoproteins are key factors in late immune recovery in successfully treated HIV-infected patients.  
*Clinical Science*, 2019, 133, 997-1010, PMID: 30952809, FI: 5.237, Original

Ribera J, Granada I, Morgades M, ..., **MORALEDA JM** et al.  
The poor prognosis of low hypodiploidy in adults with B-cell precursor acute lymphoblastic leukaemia is restricted to older adults and elderly patients.  
*British Journal of Haematology*, 2019, 186, 263-268, PMID: 30916384, FI: 5.206, Original

Del Barrio-Tofino E, Zamorano L, Cortes-Lara S et al. COLABORADORES: Galan F, Gracia I, Rodriguez MA, ..., **YAGUE G** et al.

Spanish nationwide survey on *Pseudomonas aeruginosa* antimicrobial resistance mechanisms and epidemiology.

*Journal of Antimicrobial Chemotherapy*, 2019, 74, 1825-1835, PMID: 30989186, FI: 5.113, Original

Del Barrio-Tofino E, Sanchez-Diener I, Zamorano L et al. COLABORADORES: Galan F, Gracia I, Rodriguez MA, ..., **YAGUE G** et al.

Association between *Pseudomonas aeruginosa* O-antigen serotypes, resistance profiles and high-risk clones: results from a Spanish nationwide survey.

*Journal of Antimicrobial Chemotherapy*, 2019, 74, 3217-3220, PMID: 31430372, FI: 5.113, Original

Diaz C, Perez Del Palacio J, **VALERO-GUILLEN PL** et al.

Comparative Metabolomics between *Mycobacterium tuberculosis* and the MTBVAC Vaccine Candidate.

*Acs Infectious Diseases*, 2019, 5, 1317-1326, PMID: 31099236, FI: 4.911, Original

Soria-Juan B, Escacena N, Capilla-Gonzalez V, ..., **CASTELLANOS G** et al.

Cost-Effective, Safe, and Personalized Cell Therapy for Critical Limb Ischemia in Type 2 Diabetes Mellitus.

*Frontiers in Immunology*, 2019, 10, 1151, PMID: 31231366, FI: 4.716, Original

Galvez J, Galvez JJ, **GARCIA-PENARRUBIA P.**

Is TCR/pMHC Affinity a Good Estimate of the T-cell Response? An Answer Based on Predictions From 12 Phenotypic Models.

*Frontiers in Immunology*, 2019, 10, 349, PMID: 30886616, FI: 4.716, Original

**MILLAN-RIVERO JE, MARTINEZ CM, ROMECIN PA, ..., GARCIA-BERNAL D\*.**

Silk fibroin scaffolds seeded with Wharton's jelly mesenchymal stem cells enhance re-epithelialization and reduce formation of scar tissue after cutaneous wound healing.

*Stem Cell Research & Therapy*, 2019, 10, 126, PMID: 31029166, FI: 4.627, Original

**RODRIGUEZ-LOZANO FJ\***, Collado-Gonzalez M, Tomas-Catala CJ, ..., **MURCIA L.**

GuttaFlow Bioseal promotes spontaneous differentiation of human periodontal ligament stem cells into cementoblast-like cells.

*Dental Materials*, 2019, 35, 114-124, PMID: 30466731, FI: 4.44, Original

**BERNAL E\***, Martinez M, Torres A, ..., **MINGUELA A.**

T cell senescence predicts subclinical atherosclerosis in HIV-infected patients similarly to traditional cardiovascular risk factors.

*Antiviral Research*, 2019, 162, 163-170, PMID: 30593833, FI: 4.13, Original

**BUENO C\***, Martinez-Morga M, Martinez S.

Non-proliferative neurogenesis in human periodontal ligament stem cells.

*Scientific Reports*, 2019, 9, 18038, PMID: 31792338, FI: 4.011, Original

Ferreira CMA, Sassone LM, Goncalves AS, ..., **RODRIGUEZ-LOZANO FJ\*** et al.

Physicochemical, cytotoxicity and in vivo biocompatibility of a high-plasticity calcium-silicate based material.

*Scientific Reports*, 2019, 9, 3933, PMID: 30850648, FI: 4.011, Original

Llena C, Collado-Gonzalez M, **GARCIA-BERNAL D, ..., RODRIGUEZ-LOZANO FJ\*** et al.

Comparison of diffusion, cytotoxicity and tissue inflammatory reactions of four commercial bleaching products against human dental pulp stem cells.

*Scientific Reports*, 2019, 9, 7743, PMID: 31123303, FI: 4.011, Original

**BERNAL E\***, Torres M, **ALCARAZ A** et al.

Association Between Erectile Dysfunction and Carotid Subclinical Atherosclerosis in HIV-Infected Patients.

*Aids-Journal of Acquired Immune Deficiency Syndromes*, 2019, 80, 429-435, PMID: 30664536, FI: 3.863, Original

Sahebi F, Garderet L, Kanate AS, ..., **MORALEDA JM** et al.

Outcomes of Haploidentical Transplantation in Patients with Relapsed Multiple Myeloma: An EBMT/CIBMTR Report.

*Biology of Blood and Marrow Transplantation*, 2019, 25, 335-342, PMID: 30243581, FI: 3.599, Original

Faraci M, Diesch T, Labopin M, ..., **MORALEDA JM** et al.

Gonadal Function after Busulfan Compared with Treosulfan in Children and Adolescents Undergoing Allogeneic Hematopoietic Stem Cell Transplant.

*Biology of Blood and Marrow Transplantation*, 2019, 25, 1786-1791, PMID: 31082473, FI: 3.599, Original

Akkerman O, Aleksa A, Alffenaar JW, ..., **BERNAL E\*** et al.

Surveillance of adverse events in the treatment of drug-resistant tuberculosis: A global feasibility study.

*International Journal of Infectious Diseases*, 2019, 83, 72-76, PMID: 30953827, FI: 3.538, Original

Ruiz-Borrego M, Guerrero-Zotano A, Bermejo B et al. COLABORADORES: Segui MA, Ayala F, de la Haba J, ..., **SUREDA M** et al.

Phase III evaluating the addition of fulvestrant (F) to anastrozole (A) as adjuvant therapy in postmenopausal women with hormone receptor-positive HER2-negative (HR+/HER2-) early breast cancer (EBC): results from the GEICAM/2006-10 study.

*Breast Cancer Research and Treatment*, 2019, 177, 115-125, PMID: 31152327, FI: 3.471, Original



**MARTINEZ-ESPARZA M\*, RUIZ-ALCARAZ AJ, CARMONA-MARTINEZ V, ..., GARCIA-PENARRUBIA P.**

Expression of LAIR-1 (CD305) on Human Blood Monocytes as a Marker of Hepatic Cirrhosis Progression.

*Journal of Immunology Research*, 2019, 2019, 2974753, PMID: 31019980, FI: 3.404, Original

**HERNANDEZ-CASELLES T\*, Miguel RC, RUIZ-ALCARAZ AJ, GARCIA-PENARRUBIA P.**

CD33 (Siglec-3) Inhibitory Function: Role in the NKG2D/DAP10 Activating Pathway.

*Journal of Immunology Research*, 2019, 2019, 6032141, PMID: 31143782, FI: 3.404, Original

Ruiz V, Jiang P, Muller C, ..., **MESSEGUER-OLMO L** et al.

Preparation and characterization of *Nephila clavipes* tubuliform silk gut.

*Soft Matter*, 2019, 15, 2960-2970, PMID: 30901019, FI: 3.399, Original

Valero Cifuentes S, Garcia Villalba E, **ALCARAZ GARCIA A, ..., BERNAL MORELL E.**

Prognostic value of pro-adrenomedullin and NT-proBNP in patients referred from the emergency department with influenza syndrome.

*Emergencias*, 2019, 31, 180-184, PMID: 31210450, FI: 3.35, Original

**RODRIGUEZ-LOZANO FJ\***, Collado-Gonzalez M, Lopez-Garcia S et al.

Evaluation of changes in ion release and biological properties of NeoMTA-Plus and Endocem-MTA exposed to an acidic environment.

*International Endodontic Journal*, 2019, 52, 1196-1209, PMID: 30828816, FI: 3.331, Original

Munoz E, Forner L, Garcet S, **RODRIGUEZ-LOZANO FJ** et al.

Canal shaping with a reciprocating system is easy to learn.

*International Endodontic Journal*, 2019, 52, 1244-1249, PMID: 30865308, FI: 3.331, Original

**GALINDO-VILLEGAS J**, Garcia-Alcazar A, **MESEGUER J, MULERO V\***.

Aluminum adjuvant potentiates gilthead seabream immune responses but induces toxicity in splenic melanomacrophage centers.

*Fish & Shellfish Immunology*, 2019, 85, 31-43, PMID: 29510253, FI: 3.298, Original

**GARCIA-MORENO D\***, Tyrkalska SD, **VALERA-PEREZ A, ..., PEREZ-OLIVA AB\*, MULERO V\***.

The zebrafish: A research model to understand the evolution of vertebrate immunity.

*Fish & Shellfish Immunology*, 2019, 90, 215-222, PMID: 31039438, FI: 3.298, Original

**VALERA-PEREZ A, TYRKALSKA SD**, Viana C, ..., **GARCIA-MORENO D\*, ..., MULERO V\***.

WDR90 is a new component of the NLRC4 inflammasome involved in *Salmonella* Typhimurium resistance.

*Developmental and Comparative Immunology*, 2019, 100, 103428, PMID: 31276698, FI: 3.119, Original

**MARTINEZ-NAVARRO FJ, MARTINEZ-MENCHON T, MULERO V, GALINDO-VILLEGAS J.**

Models of human psoriasis: Zebrafish the newly appointed player.

*Developmental and Comparative Immunology*, 2019, 97, 76-87, PMID: 30953679, FI: 3.119, Original

Lopez-Garcia S, Pecci-Lloret MP, Pecci-Lloret MR, ..., **RODRIGUEZ-LOZANO FJ\*** et al.

In Vitro Evaluation of the Biological Effects of ACTIVA Kids BioACTIVE Restorative, Ionolux, and Riva Light Cure on Human Dental Pulp Stem Cells.

*Materials*, 2019, 12, PMID: 31717445, FI: 2.972, Original

Sanz JL, **RODRIGUEZ-LOZANO FJ**, Llena C et al.

Bioactivity of Bioceramic Materials Used in the Dentin-Pulp Complex Therapy: A Systematic Review.

*Materials*, 2019, 12, PMID: 30934746, FI: 2.972, Revisión

Lopez-Garcia S, Pecci-Lloret MR, Guerrero-Girones J, ..., **RODRIGUEZ-LOZANO FJ\*** et al.

Comparative Cytocompatibility and Mineralization Potential of Bio-C Sealer and TotalFill BC Sealer.

*Materials*, 2019, 12, PMID: 31546696, FI: 2.972, Original

Perez AB, Chueca N, Macias J, ..., **BERNAL E** et al.

Prevalence of resistance associated substitutions and efficacy of baseline resistance-guided chronic hepatitis C treatment in Spain from the GEHEP-004 cohort.

*Plos one*, 2019, 14, e0221231, PMID: 31469856, FI: 2.776, Original

**MECA-LALLANA JE\***, Prieto-Gonzalez JM, Jimenez-Veiga J et al.

Development and validation of a brief electronic screening test for cognitive impairment in multiple sclerosis (SCI-MS Test).

*Multiple Sclerosis and Related Disorders*, 2019, 28, 50-56, PMID: 30553169, FI: 2.725, Original

Pagan A, Aznar-Cervantes SD, Perez-Rigueiro J, **MESEGUER-OLMO L** et al.

Potential use of silkworm gut fiber braids as scaffolds for tendon and ligament tissue engineering.

*Journal of Biomedical Materials Research Part B-Applied Biomaterials*, 2019, 107, 2209-2215, PMID: 30675993, FI: 2.674, Original

**SIMON M\***, Gil-Gallardo LJ, **ASUNCION IBORRA M, ..., SEGOVIA M.**

An observational longitudinal study to evaluate tools and strategies available for the diagnosis of Congenital Chagas Disease in a non-endemic country.

*Acta Tropica*, 2019, 199, 105127, PMID: 31394076, FI: 2.629, Original

Cabello L, Gomez-Herreros E, Fernandez-Pereira J, ..., **MARTINEZ-ESPARZA MC** et al.  
Deletion of GLX3 in *Candida albicans* affects temperature tolerance, biofilm formation and virulence.

*Fems Yeast Research*, 2019, 19, PMID: 30476034, FI: 2.458, Original

Collado-Gonzalez M, Lopez-Garcia S, GARCIA-BERNAL D, ..., **RODRIGUEZ-LOZANO FJ\***.  
Biological effects of acid-eroded MTA Repair HP and ProRoot MTA on human periodontal ligament stem cells.

*Clinical Oral Investigations*, 2019, 23, 3915-3924, PMID: 30684060, FI: 2.453, Original

Ramos Elbal E, **GALERA MINARRO AM**, Llinares Riestra ME, ..., **FUSTER SOLER JL**.

Neuroblastoma: validation of the INRG classification system in a small series.

*Clinical & Translational Oncology*, 2019, 21, 1776-1780, PMID: 30949929, FI: 2.441, Original

Bautista F, Canete A, Ramirez-Villar GL, ..., **FUSTER JL** et al.

ECLIM-SEHOP, a new platform to set up and develop international academic clinical trials for childhood cancer and blood disorders in Spain.

*Clinical & Translational Oncology*, 2019, 21, 1763-1770, PMID: 31598904, FI: 2.441, Original

Ciruelos EM, Diaz MN, Isla MD, ..., **CEREZUELA P** et al.

Patient preference for oral chemotherapy in the treatment of metastatic breast and lung cancer.

*European Journal of Cancer Care*, 2019, 28, e13164, PMID: 31571304, FI: 2.421, Original

**QUESADA MP\***, **GARCIA-BERNAL D**, Pastor D et al.

Safety and Biodistribution of Human Bone Marrow-Derived Mesenchymal Stromal Cells Injected Intrathecally in Non-Obese Diabetic Severe Combined Immunodeficiency Mice: Preclinical Study.

*Tissue Engineering and Regenerative Medicine*, 2019, 16, 525-538, PMID: 31624707, FI: 2.272, Original

Llena C, Esteve I, **RODRIGUEZ-LOZANO FJ** et al.

The application of casein phosphopeptide and amorphous calcium phosphate with fluoride (CPP-ACPF) for restoring mineral loss after dental bleaching with hydrogen or carbamide peroxide: An in vitro study.

*Annals of Anatomy-Anatomischer Anzeiger*, 2019, 225, 48-53, PMID: 31271888, FI: 2.241, Original

Montero-Martin G, Mallempati KC, Gangavarapu S, ..., **MURO M** et al.

High-resolution characterization of allelic and haplotypic HLA frequency distribution in a Spanish population using high-throughput next-generation sequencing.

*Human Immunology*, 2019, 80, 429-436, PMID: 30763600, FI: 2.202, Original

**RUIZ-ALCARAZ AJ\***, **CARMONA-MARTINEZ V**, Guirado A, ..., **GARCIA-PENARRUBIA P\***.

Anti-leukemia activity of 4-amino-2-aryl-6,9-dichlorobenzo[g]pteridines.

*Naunyn-Schmiedeberg's Archives of Pharmacology*, 2019, 392, 219-227, PMID: 30465054, FI: 2.058, Original

Broch Porcar MJ, Rodriguez Cubillo B, Dominguez-Roldan JM, ..., **DE GEA GARCIA JH** et al.

Practical document on the management of hyponatremia in critically ill patients.

*Medicina Intensiva*, 2019, 43, 302-316, PMID: 30678998, FI: 1.982, Original

Guirao-Abad JP, Pujante V, Sanchez-Fresneda R, **YAGUE G** et al.

Sensitivity of the *Candida albicans* trehalose-deficient mutants tps1Delta and tps2Delta to amphotericin B and micafungin.

*Journal of Medical Microbiology*, 2019, 68, 1479-1488, PMID: 31380734, FI: 1.926, Original

Lorusso D, Hilpert F, Gonzalez Martin A, ..., **MARTINEZ-GARCIA J** et al.

Patient-reported outcomes and final overall survival results from the randomized phase 3 PENELOPE trial evaluating pertuzumab in low tumor human epidermal growth factor receptor 3 (HER3) mRNA-expressing platinum-resistant ovarian cancer.

*International Journal of Gynecological Cancer*, 2019, 29, 1141-1147, PMID: 31420414, FI: 1.746, Original

**LEGAZ I\***, Navarro Noguera E, **BOLARIN JM, ..., MURO M.**

Patient Sex in the Setting of Liver Transplant in Alcoholic Liver Disease.

*Experimental and Clinical Transplantation*, 2019, 17, 355-362, PMID: 29957165, FI: 0.754, Original

Martinez-Morga M, **PAZ QUESADA M, BUENO C** et al.

[Neurobiological bases of autism and cellular models for its experimental study].

*Medicina-Buenos Aires*, 2019, 79, 27-32, PMID: 30776276, FI: 0.525, Original

# AREA 7: BIOTECHNOLOGY. HEALTH APPLICATIONS IN BIOSCIENCES

The Area 7 “Biotechnology. Health Applications of Biosciences” is a multidisciplinary area that includes seven groups whose research interests include biology, biochemistry, bio-membranes, cellular signaling, physiology, enzymology, radiology, reproductive technologies, and the application of computational methods for supporting health research. Three research groups of this area have been recognized by the Fundación Seneca, the regional Science and Technology Agency, as Groups of Excellence: Biology of Reproduction, Biochemistry and Enzymatic Biotechnology, and Reproductive Physiology and Assisted Reproduction.

140 researchers have been involved in the research activities of this area, which are classified as 16 principal investigators (R3+R4), 91 postdoctoral researchers (R2), 29 predoctoral researchers (R1) and 4 technicians. 45% of the researchers are female and 17% have also clinical activities.

Our main strengths are our expertise and specialization in the different areas of study and knowledge and the number and quality of international collaborations. Our research groups are also involved in bachelor, master and doctoral degrees whose quality not only has been accredited by the Spanish Agency ANECA, but also by the European Union, since we are running a Marie-Skłodowska Curie Innovative Training Network. 9 students have completed their PhD in this area in 2019. This is a satisfactory indicator, which shows our commitment to the training of the future researchers of the institute.

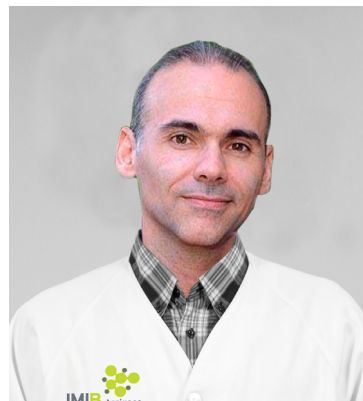
Our research activities have funded in 2019 by 18 research projects (1 funded by international agencies, 8 by national agencies and 9 regional ones), and one clinical trial. This shows that the area has been able to attract funding from national and regional sources, but we should be able to get more funding from international sources, since the number of international collaborations is not in line with the number of active international projects. It would also be positive for the area to be involved in more clinical trials, although we have the limitations that most of our groups are not clinical. Patenting should be set as an objective for the next years, since no patent has been obtained in 2019 by the researchers of the Area.

We have published 49 papers. The ratios of 40.82% of publications in the first quartile and 36.73% in the first decile are the highest in the institute for 2019. The impact factor accumulated for these publications has been 165.497. The comparison with the publications obtained in 2018 show that we have published more papers (49-31), a higher impact factor (165.497-93.794), increased the impact factor by paper (3.38-3.02), the ratio of papers in the first decile (36.73%-10%), and the ratio of papers in the first quartile or decile (77.55%-61%).

The publications of the area with the highest impact factor in 2019 have been in the following five journals: *New Phytologist* (IF 7.299), *Mbio* (IF 6.747), *Journal of Clinical Medicine* (IF5.688), *Food Chemistry* (IF 5.399), and *PLOS Genetics* (IF 5.224). Our objectives of improving the results from last year are therefore met, and we hope to keep improving our ratios in the future.

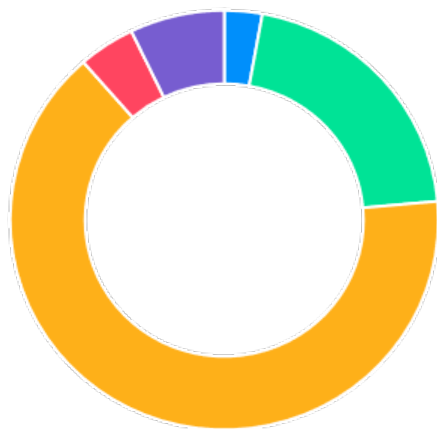
The area 7 has seven groups:

- › Reproductive Biology
- › Biomembranes and Cell Signaling
- › Biochemistry and Enzymatic Biotechnology
- › Reproductive Physiology and Assisted Reproduction
- › Molecular systems Biology
- › Technologies of Modeling, Processing and Knowledge Management
- › Research in Radiology



**COORDINATOR OF AREA 7**  
**DR. JESUALDO TOMÁS FERNÁNDEZ BREIS**

These groups have a total of 140 researchers:



- Others
- R1
- R2
- R3
- R4

| OTHER | R1 | R2 | R3 | R4 | TOTAL |
|-------|----|----|----|----|-------|
| 4     | 29 | 91 | 6  | 10 | 140   |

Research classification (Euraxess)

Selected publications based on the leadership of researchers and the last author or author of correspondence (marked with an asterisk) and ordered by the impact factor of the journal

**GANDIA-HERRERO F\*, GARCIA-CARMONA F.**

The dawn of betalains.

*New Phytologist*, 2019, 10.1111/nph.16295 [doi], PMID: 31782527, FI: 7.299, Original

Contreras-Llano LE, Guerrero-Rubio MA, Lozada-Ramirez JD, ..., **GANDIA-HERRERO F\***.

First Betalain-Producing Bacteria Break the Exclusive Presence of the Pigments in the Plant Kingdom.

*Mbio*, 2019, 10, PMID: 30890610, FI: 6.747, Original

**GUZMAN-AROCA F\*, BERNA-SERNA JD, GARCIA-ORTEGA AA, ..., BERNA-MESTRE JD\***.

A New Management Technique for Symptomatic Haematomas Following Therapeutic Vacuum-Assisted Biopsy.

*Journal of Clinical Medicine*, 2019, 8, PMID: 31546843, FI: 5.688, Original

Guerrero-Rubio **MA**, **HERNANDEZ-GARCIA S**, **GARCIA-CARMONA F**, **GANDIA-HERRERO F\***.

Extension of life-span using a RNAi model and in vivo antioxidant effect of Opuntia fruit extracts and pure betalains in *Caenorhabditis elegans*.

*Food Chemistry*, 2019, 274, 840-847, PMID: 30373018, FI: 5.399, Original

**PEREZ-PATINO C, PARRILLA I, LI J, ..., ROCA J\***.

The Proteome of Pig Spermatozoa Is Remodeled During Ejaculation.

*Molecular & Cellular Proteomics*, 2019, 18, 41-50, PMID: 30257877, FI: 4.828, Original

List of remaining publications in the area during 2019 ordered by impact factor (at least the first author affiliated to the IMIB is identified in bold. In addition an asterisk indicates if the last or corresponding author is affiliated to the IMIB. A # identifies publications of researchers recently affiliated to the IMIB and whose 2019 production comes from their previous research centers):

Martin-Mora D, **ORTEGA A**, Matilla MA et al.

The Molecular Mechanism of Nitrate Chemotaxis via Direct Ligand Binding to the PilJ Domain of McpN.

*Mbio*, 2019, 10, PMID: 30782655, FI: 6.747, Original

Gomez-Gil E, Franco A, **MADRID M** et al.

Quorum sensing and stress-activated MAPK signaling repress yeast to hypha transition in the fission yeast *Schizosaccharomyces japonicus*.

*Plos Genetics*, 2019, 15, e1008192, PMID: 31150379, FI: 5.224, Original

Navarrete FA, Aguila L, Martin-Hidalgo D, ..., **GARCIA-VAZQUEZ FA** et al.  
Transient Sperm Starvation Improves the Outcome of Assisted Reproductive Technologies.  
*Frontiers in Cell and Developmental Biology*, 2019, 7, 262, PMID: 31750304, FI: 5.206, Original

Guerrero-Rubio MA, Lopez-Llorca R, Henarejos-Escudero P, ..., **GANDIA-HERRERO F\***.  
Scaled-up biotechnological production of individual betalains in a microbial system.  
*Microbial Biotechnology*, 2019, 12, 993-1002, PMID: 31270958, FI: 4.857, Original

Dorado B, Ploen GG, Baretino A, ..., **GADEA J** et al.  
Generation and characterization of a novel knockin minipig model of Hutchinson-Gilford progeria syndrome.  
*Cell Discovery*, 2019, 5, 16, PMID: 30911407, FI: 4.6, Original

**LOZANO TEROL G, GALLEG0-JARA J\*, SOLA MARTINEZ RA, ..., DE DIEGO PUENTE T\***.  
Engineering protein production by rationally choosing a carbon and nitrogen source using E. coli BL21 acetate metabolism knockout strains.  
*Microbial Cell Factories*, 2019, 18, 151, PMID: 31484572, FI: 4.402, Original

**PASTOR JM\***, Borges N, Pagan JP, ..., **CANOVAS M\***.  
Fructose metabolism in *Chromohalobacter salexigens*: interplay between the Embden-Meyerhof-Parnas and Entner-Doudoroff pathways.  
*Microbial Cell Factories*, 2019, 18, 134, PMID: 31409414, FI: 4.402, Original

**BERNABE-DIAZ JA\***, **LEGAZ-GARCIA MD\***, Garcia JM, **FERNANDEZ-BREIS JT\***.  
Efficient, semantics-rich transformation and integration of large datasets  
*Expert Systems With Applications*, 2019, 133, PMID: -, FI: 4.292, Original

**PEREZ-PATINO C, BARRANCO I, LI J, ..., ROCA J\*, PARRILLA I.**  
Cryopreservation Differentially Alters the Proteome of Epididymal and Ejaculated Pig Spermatozoa.  
*International Journal of Molecular Sciences*, 2019, 20, PMID: 30978930, FI: 4.183, Original

**CANHA-GOUVEIA A\***, Paradela A, Ramos-Fernandez A, ..., **PRIETO-SANCHEZ MT\***, ..., **COY P\***.  
Which Low-Abundance Proteins are Present in the Human Milieu of Gamete/Embryo Maternal Interaction?  
*International Journal of Molecular Sciences*, 2019, 20, PMID: 31653120, FI: 4.183, Original

Fernandez M, Rico-Jimenez M, **ORTEGA A\*** et al.  
Determination of Ligand Profiles for *Pseudomonas aeruginosa* Solute Binding Proteins.  
*International Journal of Molecular Sciences*, 2019, 20, PMID: 31627455, FI: 4.183, Original



Hamze JG, **CANHA-GOUVEIA A, ALGARRA B, ..., ROMAR R\*, JIMENEZ-MOVILLA M\***.

Mammalian spermatozoa and cumulus cells bind to a 3D model generated by recombinant zona pellucida protein-coated beads.

*Scientific Reports*, 2019, 9, 17989, PMID: 31784633, FI: 4.011, Original

**BARRANCO I**, Padilla L, Parrilla I, ..., **ROCA J\***.

Extracellular vesicles isolated from porcine seminal plasma exhibit different tetraspanin expression profiles.

*Scientific Reports*, 2019, 9, 11584, PMID: 31399634, FI: 4.011, Original

**PEREZ-PATINO C, LI J, BARRANCO I, ..., ROCA J\*, PARRILLA I.**

The proteome of frozen-thawed pig spermatozoa is dependent on the ejaculate fraction source.

*Scientific Reports*, 2019, 9, 705, PMID: 30679492, FI: 4.011, Original

**GALLEGO-JARA J\*, TEROL GL\*, ECIJA CONESA A, ..., DE DIEGO PUENTE T.**

Characterization of acetyl-CoA synthetase kinetics and ATP-binding.

*Biochimica et Biophysica Acta-General Subjects*, 2019, 1863, 1040-1049, PMID: 30928490, FI: 3.681, Original

Campillo JA, Sevilla A, Gonzalez-Fernandez C, ..., **CANOVAS M** et al.

Metabolomic responses of mussel *Mytilus galloprovincialis* to fluoranthene exposure under different nutritive conditions.

*Marine Environmental Research*, 2019, 144, 194-202, PMID: 30709639, FI: 3.445, Original

**SORIANO-UBEDA C, ROMERO-AGUIRREGOMEZCORTA J, MATAS C, ..., GARCIA-VAZQUEZ FA\***.

Manipulation of bicarbonate concentration in sperm capacitation media improves in vitro fertilisation output in porcine species.

*Journal of Animal Science and Biotechnology*, 2019, 10, 19, PMID: 30899459, FI: 3.441, Original

Llamas-Lopez PJ, Lopez-Ubeda R, Lopez G, ..., **GARCIA-VAZQUEZ FA\***.

A new device for deep cervical artificial insemination in gilts reduces the number of sperm per dose without impairing final reproductive performance.

*Journal of Animal Science and Biotechnology*, 2019, 10, 11, PMID: 30774949, FI: 3.441, Original

Zapata-Carmona H, **SORIANO-UBEDA C**, Paris-Oller E, **MATAS C\***.

Periovarian oviductal fluid decreases sperm protein kinase A activity, tyrosine phosphorylation, and in vitro fertilization in pig.

*Andrology*, 2019, 10.1111/andr.12751 [doi], PMID: 31872543, FI: 3.106, Original

Antonino DC, Soares MM, Junior JM, ..., **VIEIRA LA** et al.

Three-dimensional levitation culture improves in-vitro growth of secondary follicles in bovine model.

*Reproductive Biomedicine Online*, 2019, 38, 300-311, PMID: 30639159, FI: 2.93, Original

**STAIKU FD**, Lopez-Ubeda R, **ROMERO-AGUIRREGOMEZCORTA J**, ..., **MATAS PARRA C\***.

Regulation of boar sperm functionality by the nitric oxide synthase/nitric oxide system. *Journal of Assisted Reproduction and Genetics*, 2019, 36, 1721-1736, PMID: 31325069, FI: 2.82, Original

**CARBONELL G\***, **BERNA-SERNA JD**, Oltra L, ..., **BERNA-MESTRE JD**.

Evaluation of rat liver with ARFI elastography: In vivo and ex vivo study. *Plos one*, 2019, 14, e0217297, PMID: 31120974, FI: 2.776, Original

Sa NAR, **VIEIRA LA**, Ferreira ACA et al.

Anethole Supplementation During Oocyte Maturation Improves In Vitro Production of Bovine Embryos.

*Reproductive Sciences*, 2019, , 1933719119831783, PMID: 30808260, FI: 2.559, Original

Luongo C, Abril-Sanchez S, Hernandez JG, **GARCIA-VAZQUEZ FA\***.

Seminal plasma mitigates the adverse effect of uterine fluid on boar spermatozoa. *Theriogenology*, 2019, 136, 28-35, PMID: 31234054, FI: 2.299, Original

# Fair S, **ROMERO-AGUIRREGOMEZCORTA J**.

Implications of boar sperm kinematics and rheotaxis for fertility after preservation. *Theriogenology*, 2019, 137, 15-22, PMID: 31176491, FI: 2.299, Original

**BARRANCO I**, Padilla L, Tvarijonaviciute A, ..., **ROCA J\***.

Levels of activity of superoxide dismutase in seminal plasma do not predict fertility of pig AI-semen doses.

*Theriogenology*, 2019, 140, 18-24, PMID: 31421531, FI: 2.299, Original

**PARRILLA I\***, **PEREZ-PATINO C**, **LI J**, ..., **ROCA J**.

Boar semen proteomics and sperm preservation.

*Theriogenology*, 2019, 137, 23-29, PMID: 31208776, FI: 2.299, Original

**MARTINEZ CA**, Cambra JM, **NOHALEZ A**, ..., **MARTINEZ EA\***, **CUELLO C**.

Porcine blastocyst viability and developmental potential is maintained for 48h of liquid storage at 25 degrees C without CO2 gassing.

*Theriogenology*, 2019, 135, 46-55, PMID: 31200096, FI: 2.299, Original

**MARTINEZ CA**, Cambra JM, Maside C, ..., **PARRILLA I\***, **GIL MA**.

High pre-freezing sperm dilution improves monospermy without affecting the penetration rate in porcine IVF.

*Theriogenology*, 2019, 131, 162-168, PMID: 30974393, FI: 2.299, Original

Lopes JS, **CANHA-GOUVEIA A**, Paris-Oller E, **COY P\***.

Supplementation of bovine follicular fluid during in vitro maturation increases oocyte cumulus expansion, blastocyst developmental kinetics, and blastocyst cell number.

*Theriogenology*, 2019, 126, 222-229, PMID: 30590243, FI: 2.299, Original

**GARCIA-VAZQUEZ FA\***, Mellagi APG, Ulguim RR et al.

Post-cervical artificial insemination in porcine: The technique that came to stay.

*Theriogenology*, 2019, 129, 37-45, PMID: 30797138, FI: 2.299, Original

**GARCIA-VAZQUEZ FA\***, Llamas-Lopez PJ, Jacome MA et al.

Morphological changes in the porcine cervix: A comparison between nulliparous and multiparous sows with regard to post-cervical artificial insemination.

*Theriogenology*, 2019, 127, 120-129, PMID: 30685687, FI: 2.299, Original

Romar R, **CANOVAS S**, **MATAS C**, ..., **COY P**.

Pig in vitro fertilization: Where are we and where do we go?

*Theriogenology*, 2019, 137, 113-121, PMID: 31182223, FI: 2.299, Original

Zhou LT, **ROMAR R**, Pavone ME et al.

Disruption of O-GlcNAc homeostasis during mammalian oocyte meiotic maturation impacts fertilization.

*Molecular Reproduction and Development*, 2019, 86, 543-557, PMID: 30793403, FI: 2.124, Original

**MARTINEZ CA**, Cambra JM, **PARRILLA I**, ..., **CUELLO C\*** et al.

Seminal Plasma Modifies the Transcriptional Pattern of the Endometrium and Advances Embryo Development in Pigs.

*Frontiers in Veterinary Science*, 2019, 6, 465, PMID: 31921921, FI: 2.029, Original

**BARRANCO I**, Padilla L, **PEREZ-PATINO C**, ..., **ROCA J\***, **PARRILLA I**.

Seminal Plasma Cytokines Are Predictive of the Outcome of Boar Sperm Preservation.

*Frontiers in Veterinary Science*, 2019, 6, 436, PMID: 31867346, FI: 2.029, Original

**MARTINEZ-HERNANDEZ J**, **SECO-ROVIRA V**, **BELTRAN-FRUTOS E**, ..., **PASTOR LM\***.

Lectin-binding pattern of glycoconjugates during spontaneous testicular recrudescence in Syrian hamster (*Mesocricetus auratus*) after exposure to short photoperiod.

*Andrologia*, 2019, 51, e13148, PMID: 30246471, FI: 1.84, Original

**GADEA J\***, Toledano-Diaz A, Navarro-Serna S et al.

Assessment and preservation of liquid and frozen-thawed Black crested mangabey (*Lophocebus aterrimus*) spermatozoa obtained by transrectal ultrasonic-guided massage of the accessory sex glands and electroejaculation.

*Animal Reproduction Science*, 2019, 210, 106176, PMID: 31635773, FI: 1.817, Original

# Correia HHV, **VIEIRA LA**, Mielgo CM et al.

Cilostamide affects in a concentration and exposure time-dependent manner the viability and the kinetics of in vitro maturation of caprine and bovine oocytes.

*Research in Veterinary Science*, 2019, 122, 22-28, PMID: 30448391, FI: 1.751, Original

Martinez-Fresneda L, O'Brien E, Velazquez R, ..., **MARTINEZ-CACERES CM** et al.

Seasonal variation in sperm freezability associated with changes in testicular germinal epithelium in domestic (*Ovis aries*) and wild (*Ovis musimon*) sheep.

*Reproduction Fertility and Development*, 2019, 31, 1545-1557, PMID: 31182186, FI: 1.723, Original

**GARCIA-VAZQUEZ FA**, **SORIANO-UBEDA C**, Laguna-Barraza R, ..., **COY P\***.

Tissue plasminogen activator (tPA) of paternal origin is necessary for the success of in vitro but not of in vivo fertilisation in the mouse.

*Reproduction Fertility and Development*, 2019, 31, 433-442, PMID: 30304664, FI: 1.723, Original

# **ROMERO-AGUIRREGOMEZCORTA J**, Cronin S, Donnellan E et al.

Progesterone induces the release of bull spermatozoa from oviductal epithelial cells.

*Reproduction Fertility and Development*, 2019, 31, 1463-1472, PMID: 31030724, FI: 1.723, Original

Maside C, **MARTINEZ CA**, Cambra JM, ..., **PARRILLA I\***, **CUELLO C**.

Supplementation with exogenous coenzyme Q10 to media for in vitro maturation and embryo culture fails to promote the developmental competence of porcine embryos.

*Reproduction in Domestic Animals*, 2019, 54 Suppl 4, 72-77, PMID: 31625244, FI: 1.638, Original

**MARTINEZ EA**, **MARTINEZ CA**, Cambra JM, ..., **PARRILLA I\***, **CUELLO C**.

Achievements and future perspectives of embryo transfer technology in pigs.

*Reproduction in Domestic Animals*, 2019, 54 Suppl 4, 4-13, PMID: 31625238, FI: 1.638, Original



Maternal and Child Hospital

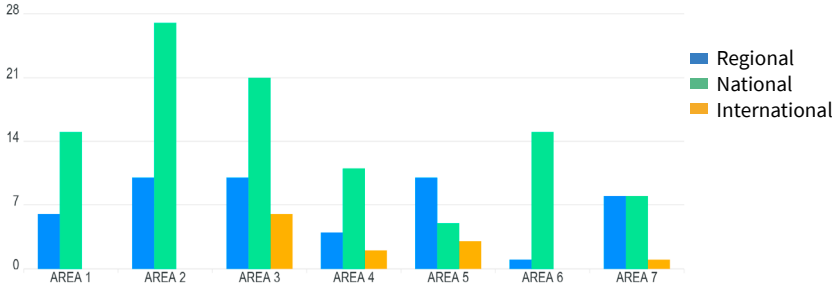


# **GROUPED RESEARCH ACTIVITY**

In 2019, a total of 13 projects have been awarded to the institute, 9 national and 4 regional.

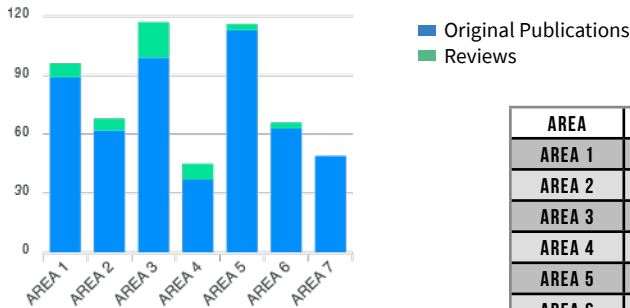
There are a total of 163 active projects, 102 of which are national, 12 international and 49 regional.

In the following graph and table, the active projects are shown grouped by areas and origin.



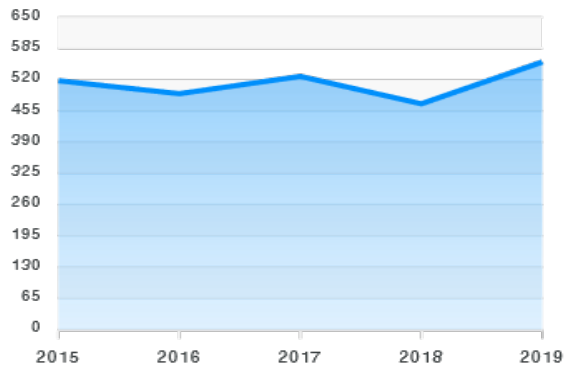
| AREA         | REGIONAL  | NATIONAL   | INTERNATIONAL | TOTAL      |
|--------------|-----------|------------|---------------|------------|
| AREA 1       | 6         | 15         | 0             | 21         |
| AREA 2       | 10        | 27         | 0             | 37         |
| AREA 3       | 10        | 21         | 6             | 37         |
| AREA 4       | 4         | 11         | 2             | 17         |
| AREA 5       | 10        | 5          | 3             | 18         |
| AREA 6       | 1         | 15         | 0             | 16         |
| AREA 7       | 8         | 8          | 1             | 17         |
| <b>TOTAL</b> | <b>49</b> | <b>102</b> | <b>12</b>     | <b>163</b> |

In the following graph and table are shown the number of scientific articles published in 2019, grouped by area and by type (original articles, reviews).

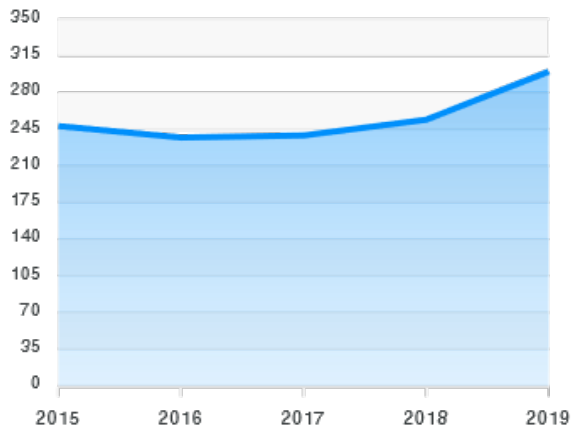


| AREA         | Nº PUBLICATIONS | Nº ORIGINALS | Nº REVIEWS |
|--------------|-----------------|--------------|------------|
| AREA 1       | 96              | 89           | 7          |
| AREA 2       | 67              | 61           | 6          |
| AREA 3       | 116             | 98           | 18         |
| AREA 4       | 48              | 39           | 9          |
| AREA 5       | 116             | 113          | 3          |
| AREA 6       | 65              | 63           | 2          |
| AREA 7       | 49              | 49           | 0          |
| <b>TOTAL</b> | <b>557</b>      | <b>512</b>   | <b>45</b>  |

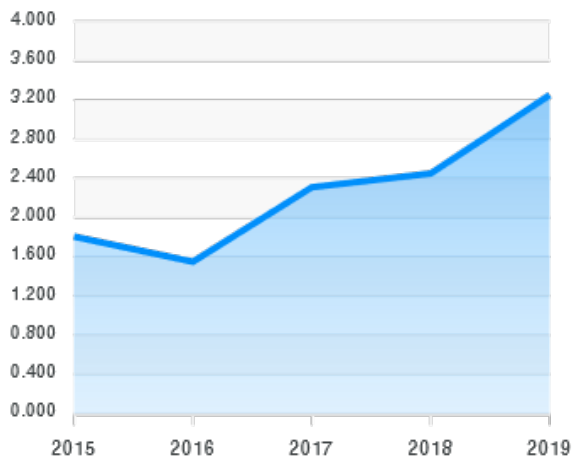
NUMBER OF ORIGINAL ARTICLES AND REVIEWS PUBLISHED IN ISI MEDIA  
(5 YEAR PROGRESSION)



LEADERSHIP INDICATOR: NUMBER OF ORIGINAL ARTICLES AND REVIEWS IN ISI  
(5 YEAR PROGRESSION)



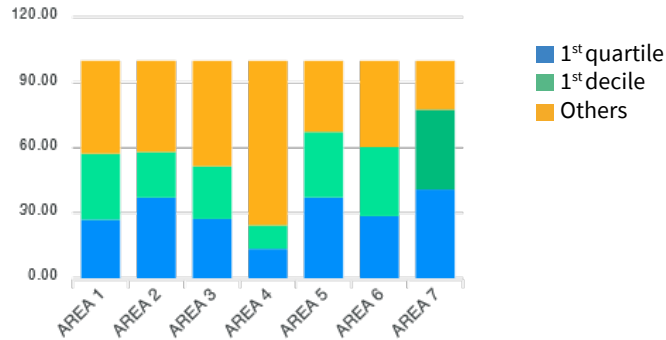
STANDARD IMPACT INDICATOR (5 YEARS PROGRESSION)



The following graph and table show the percentage of original publications published in first decile and first quartile journals of their corresponding JCR category in 2019 and grouped by areas.

| AREA         | Nº PUBLICATION | 1 <sup>ST</sup> QUARTILE | 1 <sup>ST</sup> DECILE | % 1 <sup>ST</sup> QUARTILE | 1 <sup>ST</sup> DECILE | % OTHERS      |
|--------------|----------------|--------------------------|------------------------|----------------------------|------------------------|---------------|
| AREA 1       | 89             | 24                       | 27                     | 26,97%                     | 30,34%                 | 42,70%        |
| AREA 2       | 61             | 23                       | 13                     | 37,70%                     | 21,31%                 | 40,98%        |
| AREA 3       | 98             | 26                       | 23                     | 26,53%                     | 23,47%                 | 50,00%        |
| AREA 4       | 39             | 5                        | 5                      | 12,82%                     | 12,82%                 | 74,36%        |
| AREA 5       | 113            | 42                       | 34                     | 37,17%                     | 30,09%                 | 32,74%        |
| AREA 6       | 63             | 19                       | 20                     | 30,16%                     | 31,75%                 | 38,10%        |
| AREA 7       | 49             | 20                       | 18                     | 40,82%                     | 36,73%                 | 22,45%        |
| <b>TOTAL</b> | <b>557</b>     | <b>512</b>               | <b>45</b>              | <b>31,05%</b>              | <b>27,34%</b>          | <b>41,60%</b> |

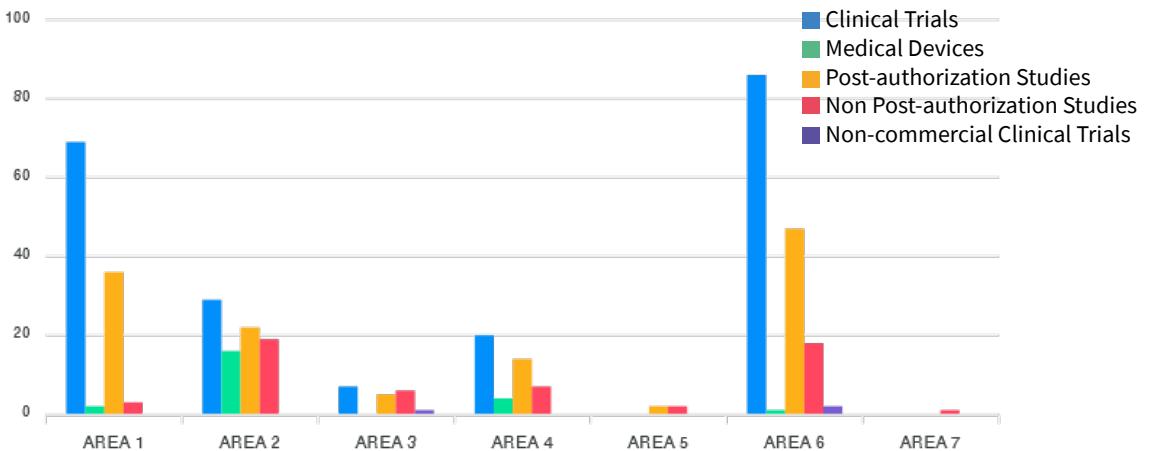




IMIB runs and leads an important number of clinical trials with medicines and health products, both commercial and non-commercial, as well as other types of clinical studies (post-authorization studies and others).

| AREA         | CT         | HP        | PAS        | NP PAS    | NC CT    | TOTAL      |
|--------------|------------|-----------|------------|-----------|----------|------------|
| AREA 1       | 69         | 2         | 36         | 3         | 0        | 110        |
| AREA 2       | 29         | 16        | 22         | 19        | 0        | 86         |
| AREA 3       | 7          | 0         | 5          | 6         | 1        | 19         |
| AREA 4       | 20         | 4         | 14         | 7         | 0        | 45         |
| AREA 5       | 0          | 0         | 2          | 2         | 0        | 4          |
| AREA 6       | 86         | 1         | 47         | 18        | 2        | 154        |
| AREA 7       | 0          | 0         | 0          | 1         | 0        | 1          |
| <b>TOTAL</b> | <b>211</b> | <b>23</b> | <b>126</b> | <b>23</b> | <b>3</b> | <b>419</b> |

\*CT: Clinical trial; HP: Health product; PAS: Post-authorization studies



During 2019, researchers from the institute have drafted four clinical practice guidelines (CPG) . These guidelines have been published in indexed journals and are in the process of being implemented in health centers of the institute.

The CPGs tackle the clinical approach to different pathologies and clinical situations such as Anaplastic Large Cell Lymphoma associated with breast implants, Hodgkin Lymphoma, antineoplastic medication, and dementia.

The CPG published in 2019 are the following:

- › Piñero Madrona, Antonio. Documento de Consenso sobre el Linfoma Anaplásico de Células Grandes Asociado a Implantes Mamarios. SESPM. ISBN: 978-84-09-15157-8. 2019
- › Moraleda Jiménez, José M<sup>a</sup>. Guía de Práctica Clínica de Geltamo para el tratamiento de pacientes con linfoma de Hodgkin. Geltamo Grupo Español de Linfomas y Trasplante Autólogo de Médula Osea. ISBN: 978-84-09-11251-7. 2019
- › Vera R, Otero MJ, Ayala de la Peña F, González-Pérez C, Peñuelas Á, Sepúlveda JM, Quer N, Doménech-Climent N, Virizuela JA, Beorlegui P, Gorgas MQ. Recommendations by the Spanish Society of Hospital Pharmacy, the Spanish Society of Oncology Nursing and the Spanish Society of Medical Oncology for the safe management of antineoplastic medication in cancer patients. *Clin Transl Oncol*. 2019 Apr;21(4):467-478. doi: 10.1007/s12094-018-1945-x. Epub 2018 Oct 8. PubMed PMID: 30298467.
- › Andreu-Reinón ME, Gavrilá D, Chirlaque MD, Colorado-Yohar SM, Amiano P, Ardanaz E, Navarro-Mateu F, Navarro C, Huerta JM. Ascertainment of Dementia Cases in the Spanish European Prospective Investigation into Cancer and Nutrition-Murcia Cohort. *Neuroepidemiology*. 2019;52(1-2):63-73. doi: 10.1159/000493209. Epub 2018 Nov 26. PubMed PMID: 30476922.



# **GROUPED RESEARCH ACTIVITY**

## **IBIPO. THE INTERNATIONAL BIOHEALTH PROJECT OFFICE**

The mainscope of the International **Biohealth Project Office – IBiPO** is to promote, stimulate and facilitate the participation of health professionals and researchers in the Region of Murcia (Consejería de Salud, SMS and the IMIB) in European and international biomedical initiatives, programs and projects.

IBiPO carries out activities through the implementation of the “Working Plan” as an operational strategy aligned with institutional strategies (Regional Strategy for Biosanitary Research and Innovation - ERIIB and the IMIB Strategic Plan 2019-2023). The activities are organized in 5 general lines of action:

- 1. The Office of International Biosanitary Projects (IBiPO)**
- 2. Technical, administrative and financial advice and management**
- 3. Training and revitalization to participate in European and international biomedical projects**
- 4. Promotion of networking**
- 5. Dissemination, communication, visibility**

#### **International Biohealth Project Office**

E-mail: [ibipo@ffis.es](mailto:ibipo@ffis.es)

Web page: <https://ibipo.imib.es>

During 2019, some of the actions carried out by the IBiPO were:

- › **Draft the Work Plan for the 2019-2021 period** as a tool for planning and managing the activities to be implemented during this period and were periodically updated.
- › It has designed, in collaboration with the CS and the SMS, **“Protocol to coordinate actions involving the European Union in the field of health in the Region of Murcia”**. The objective is to improve local coordination when preparing new Project proposals, **establishing a standardized information circuit**.
- › Advice related to proposal preparation:
  - Submitted projects: 6
  - Approved projects: 1
  - Rejected projects: 3
  - Pending evaluation: 2
- › **Technical, administrative and financial management**, monitoring the execution and justification of active European biomedical projects

› The IBiPO has worked to consolidate common lines and active channels of collaboration with other regional organizations and institutions, based on complementary profiles and mutual interest.

- Collaboration coordinating European issues in the Regional Health System (collaborative space CS - SMS - IBiPO / IMIB)
- Participation in the H2020 Good Practices Working Group of the Network of Clinical Research Management Institutions (REGIC)
- Collaboration with the *Dirección General de Unión Europea de la Consejería de Empresa, Industria y Portavocía of the Comunidad Autónoma Región de Murcia* (CARM)/ Europe Direct
- Active participation in the implementation of Line 7 of the Regional Strategy for Biosanitary Research and Innovation (ERIIB) focused on promoting participation in international projects and networks, together with professionals from the *Consejería de Salud, Instituto de Fomento de la Región de Murcia, Vicerrectorado de Internacionalización y la oficina OPERUM de la Universidad de Murcia; oficina OPECT de la Universidad Politécnica de Cartagena y la Consejería de Empleo, Investigación y Universidades.*
- Dynamization of the relationship with the National Contact Points for European issues and the Office of the Region of Murcia in Brussels.

› The IBiPO has published, through dissemination channels, information related to funding opportunities and participation in European and international biohealth programs and projects:

- Number of newsletters published: **12**
- Total number of visits on 2019: **6.436**
- Number of news of interest published: **40**
- Number of funding opportunities released: **192**

## ACTIVE INTERNATIONAL COMPETITIVE PROJECTS

In 2019, IMIB researchers have led and/or participated in the following collaborative European projects managed from the IBiPO:

### **Leadership in EU funded projects / MONOCONTRACT**

#### ***Regulation of inflammatory response by extracellular ATP and P2X7 receptor signalling: through and beyond the inflammasome (DANGER ATP)***

Scientific field: Medical and health sciences/health sciences/inflammatory diseases  
Web page: <https://cordis.europa.eu/project/id/614578/es>

- › PI: **Dr. Pablo Pelegrín Vivancos (Research Area 3)**
- › Start – end date: 01/09/2014 - 31/08/2020 (extension of implementation 1 year)
- › Call: EUROPEAN RESEARCH COUNCIL (ERC); FP7-IDEAS-ERC; ERC-2013-CoG
- › Grant Agreement number: 614578

### ***Collaborative Projects***

#### ***Joint Action on Rare Cancers (JARC)***

Scientific field: Rare cancers  
Web page: <http://jointactionrarecancers.eu/>

- › PI: **Dr. M<sup>a</sup> Dolores Chirlique López (Research Area 5)**
- › Start – end date: 01/09/2014 - 30/09/2019
- › Call: 3rd EU Health Programme 2014-2020; HP-ADHOC-2014-2020-JA-2015
- › N<sup>o</sup> Grant Agreement: 724161

#### ***Pilots for Healthy and Active Ageing (PHArA-ON)***

Scientific field: Active aging; telemonitoring  
Web page: [www.pharaon.eu](http://www.pharaon.eu)

- › PI: **Gorka Sánchez Nanclares (Research Area 5)**
- › Start – end date: 01/12/2019 - 30/11/2023
- › Servicio Murciano de Salud (beneficiary)/FFIS (3rd party)
- › Call: H2020 / Smart and healthy living at home (DT-TDS-01-2019)
- › Grant Agreement number: 857188

#### ***Demand driven co-creation for public entities (InDemand)***

Scientific field: e-Health  
Web page: [www.indemandhealth.eu](http://www.indemandhealth.eu)

- › PI: **Gorka Sánchez Nanclares (Research Area 5)**
- › Start-end date: 01/09/2017 - 30/11/2020
- › Servicio Murciano de Salud (Beneficiary) / FFIS (3rd party)
- › Call: H2020-SC6-CO-CREATION-2016-2017-SC6-CO-CREATION-2016-3
- › Grant Agreement Number: 763735



# **GROUPED RESEARCH ACTIVITY**

# **INNOVATION AND TRANSFER**

## INNOVATION COMMITTEE

The IMIB has an Innovation Committee made up of 10 members (60% women and 40% men) representing the different institutions constituting the Institute: SMS, UMU, FFIS and the IMIB itself. Furthermore, the Instituto de Fomento de la Región de Murcia (INFO) is also part of this Committee due to its crucial role in the region, and following the agreement signature with the IMIB.

The person responsible for the committee is:



MARÍA DEL MAR VÁZQUEZ DE PARGA CALVO

### ACTIVITY OF THE COMMITTEE

This committee met four times throughout 2019 and carried out the following actions:

- › Drafted a section of the Innovation Plan in accordance with the new “IMIB Strategic Plan” (2019-2023), based on the analysis of the current regional, national and international situation in innovation and transfer.
- › Prepared the Internal Regulations of the Committee that were later on approved by the IMIB Governing Council.



- › Discussed the importance of training researchers and management personnel in order to promote innovation in the IMIB.
- › Approved the inclusion of a CEO of a company from the biomedical field in the committee as a non-scientific member.

The IMIB also participates in the **Regional Strategy for Biohealth Research and Innovation** (ERIIB 2018-2022). Note that the strategic lines of action 9 to 12 are dedicated to R&D+i.

The **IMIB signed a collaboration agreement with the INFO** in order to promote the transfer of knowledge in the biomedical field.

During 2019, the **data** in transfer and innovation is the following:

- › The IMIB holds 4 patents
- › Registration of the IMIB in different biomedical transfer bulletins: INFO, ITEMAS, Tic-biomed, Redinnova, etc. to be up to date on calls, success stories and relevant training activities.
- › Thanks to the Agreement signed with the INFO, 15 research groups were visited by an INFO member, accompanied by the IMIB's Basic Deputy Scientific Director and / or the head of innovation and / or the secretary of the aforementioned Committee, for the identification and development of business opportunities. Based on these interviews, 4 possible patents were detected, 2 spin-offs and an interesting portfolio of services to offer to companies and to the National Health System. On the other hand, workshops were organized to identify suitable opportunities for transfer of technology, creation of technology-based companies and the development of possible R&D+i projects from the research groups led by the IMIB.

## ADVICE

The IMIB offered advice to several PIs and researchers regarding protection of utility models or patents, spin-offs, publication or implementation of CPG and possible contracts with different companies in our area. In summary, all the invested effort in 2019 will reap benefits in the near future.

## TRAINING IN INNOVATION

### PRESS RELEASE CARM.ES

THE “INSTITUTO DE FOMENTO” (INFO) IDENTIFIES OPPORTUNITIES TO CREATE NEW COMPANIES FROM THE RESEARCH PROJECTS OF THE MURCIA BIOMEDICAL RESEARCH INSTITUTE (IMIB)

[https://www.carm.es/web/pagina?IDCONTENIDO=98512&IDTIPO=160&RASTRO=c\\$m122,133,2086](https://www.carm.es/web/pagina?IDCONTENIDO=98512&IDTIPO=160&RASTRO=c$m122,133,2086)



Workshop organized by the Comunidad Autónoma with the Instituto de fomento (INFO) at the Virgen de la Arrixaca University Hospital

*Today, a group of researchers have participated in a workshop organized by the Comunidad Autónoma, through the Instituto de Fomento (INFO), at the Virgen de la Arrixaca University Hospital to identify opportunities for technology transfer and creation of companies based on technology and the development of possible R&D+I projects from the research teams led by the Murcia Biomedical Research Institute (IMIB).*

*According to the director of the INFO, Joaquín Gómez, “this project is part of a collaboration between consejerías de Salud y la de Empleo, Universidades, Empresa y Medio Ambiente to transfer the capabilities of the research ecosystem to the biohealth business of the Region. For this reason, we carry out these workshops, which allow data collection and exchange of impressions through interviews for the creation of new companies”.*

*Once technology transfer opportunities are identified, INFO advises, mentors and supports the creation of these innovative companies and promotes technological networking with companies, through funding and proving tools to promote entrepreneurship and innovation.*



# GROUPED RESEARCH ACTIVITY

# TRAINING

## TRAINING COMMITTEE

In 2019, 76 theses were defended, 18 of which had international mention. The table below shows the theses defended by areas.

| AREA         | WITHOUT MENTION | INTERNATIONAL MENTION | TOTAL     |
|--------------|-----------------|-----------------------|-----------|
| AREA 1       | 2               | 1                     | 3         |
| AREA 2       | 27              | 1                     | 28        |
| AREA 3       | 12              | 4                     | 16        |
| AREA 4       | 3               | 4                     | 7         |
| AREA 5       | 2               | 2                     | 4         |
| AREA 6       | 7               | 2                     | 9         |
| AREA 7       | 5               | 4                     | 9         |
| <b>TOTAL</b> | <b>58</b>       | <b>18</b>             | <b>76</b> |

The IMIB has a Training Committee, made up of 7 members (75% women and 25% men) representing the different institutions of the institute: SMS, UMU, FFIS, and the IMIB itself.

The head of the Training Committee is:



**DR. MARTA AGUDO BARRIUO**

This Committee has met six times in 2019, has organized training activities and also the following actions:

- › Preparation of a Training Plan, which includes the IMIB's strategic lines for training and scientific dissemination.
- › Drafting of the Internal Regulations of the Committee.
- › Creation of a portfolio of teachers from the Institute.

## ACTIVITY OF THE COMMITTEE

In 2019, a total of 3 research-related training activities took place at the IMIB:

### CONFERENCE

#### ***Session Commitment to Quality Recommendations “DO NOT”***

**TRAINING COORDINATOR:** Pedro Parra Hidalgo. Deputy Director for SMS quality, security and evaluation.

**MODALITY:** On site.

**GENERAL OBJECTIVE:** To publicize the collaborative work of the SMS with the *Sociedades Científicas Murcianas* “Commitment to quality. Recommendations on Do Not Do based on scientific evidence”.

#### **SPECIFIC OBJECTIVES:**

- › Inform about implementing strategies of “Do Not projects” in Health Services.
- › Inform on the proposals of the *Sociedades Científicas Murcianas* on Recommendations “Do not”.

**DESCRIPTION OF NEEDS:** The National Health System is implementing the Project Commitment to the Quality of Scientific Societies. This Project aims to reduce the use of unnecessary health interventions, i.e. those that have not shown efficacy, have little or doubtful effectiveness, are not cost-effective or not a priority.

Given the relevance of this project, it is necessary to inform the *Sociedades Científicas Murcianas* and those responsible for the management teams at national and regional level.

**DATE:** February 25, 2019

**PARTICIPANTS:** Members of Scientific *Sociedades Científicas Murcianas*, SMS managers. Heads of Units.

**PARTICIPATION:**

- › Number of attendees: 163
- › Number of female attendees: 99
- › Number of male attendees: 64

The average evaluation of the course based on the results of the satisfaction surveys of the participants was: 4´07 out of 5. Positive evaluation



University teaching pavillion. Biosciences Campus

**COURSES**

***Clinical Research Course: Standards of Good Clinical Practice***

**TRAINING COORDINATORS:**

Dr. Antonio Piñero Madrona. Medicine, General Surgery and Gastrointestinal Diseases.  
Area 1 Principal Investigator.

Dr. Andrés Sánchez Salinas, FEA Hematology.

**MODALITY:** On site.

**GENERAL OBJECTIVE:** Detailed knowledge of the Standards of Good Clinical Practice that will result in the improvement of the quality of the research carried out in Hospital Centers.

**SPECIFIC OBJECTIVES:** Acquire basic knowledge about GCP regulations in Spanish and European legislation, ethical, legal and administrative aspects of clinical research: Clinical Trials with drugs and other types of clinical studies. Train the participants to be able to participate or lead clinical research projects and clinical trials.

**DESCRIPTION OF NEEDS:** Train participants on clinical research to be able to lead or collaborate in clinical studies.

**DATE:** From 5<sup>th</sup>-13<sup>th</sup> November 2019

**HOURS:** 15

**PARTICIPANTS:** Personnel involved in research projects

**PARTICIPATION:**

- › Attendance: 40 students
- › Number of female attendees: 31
- › Number of male attendees: 9

Average course rating based on the participant satisfaction surveys: 4.04 out of 5. Positive rating.

***The virtual library of the regional health portal (Murciasalud):***

**TRAINING COORDINATOR:** Enrique Aguinaga Ontoso. Dr. Medicine. Director of the Technological Center for Health Information and Documentation (CTIDS)

**MODALITY:** On line

**GENERAL OBJECTIVE:** To make participants aware of the resources offered by the Virtual Library.

**SPECIFIC OBJECTIVES:** Learn how to obtain the full text of a document.

Learn to write search algorithms. Ask specific questions prior to the search.

Identify the most efficient resources available in the Murcia Health Virtual Library (BVMS) based on the type of question asked.

Perform searches and metasearch using resources available from the BVMS.

Know the available databases for reference and search strategies depending on the question.

Know the specific search strategies in the Pubmed database.

Perform efficient searches in the Pubmed Database.

Have a general view of specific resources.

**DESCRIPTION OF NEEDS:** The mode of access to information is immersed in a changing environment. In a few years it has gone from information on paper to information in electronic format. Traditional libraries are being complemented or even replaced by virtual libraries where users can obtain information instantly and from anywhere thanks to the development of new technologies. The training on the Murcia salud Virtual Library (BVMS) aims to publicize it, as well as its information resources, so that users acquire the necessary skills to obtain quality scientific information for clinical practice, teaching and the investigation.

**DATE:** From June 15 to July 15, 2019

**HOURS:** 25

**PARTICIPANTS:** Aimed at health professionals, health practitioners, specialist health graduates and non-specialist health graduates.

**PARTICIPATION:**

- › Attendance: 20 students
- › Number of female attendees: 12
- › Number of male attendees: 8





# GROUPED RESEARCH ACTIVITY

**QUALITY**

## QUALITY COMMITTEE

The IMIB Quality Committee is the expert advisory body whose mission is to ensure quality in the activity developed in the different areas of the Institute. The committee aims at scientific excellence and continuous improvement. It is made up of 10 members (50% women and 50% men) who represent, like the rest of the committees, the different bodies of the Institute. The person responsible for the committee is:



DR. VICTORIANO SORIA ALEDO

In 2019, the Committee drafted the “IMIB 2019-2023 Quality and Improvement Plan” that defines the actions aimed at guaranteeing the correct functioning of the research and innovation processes within the Institute’s Quality Policy.

Contact: [calidad@imib.es](mailto:calidad@imib.es)

### ACTIVITY OF THE COMMITTEE

Below are highlighted the most relevant tasks performed during 2019:

- › Active participation in the situation diagnosis phase, methodological organization of the SWOT analysis (strengths, weaknesses, opportunities, and threats) and design of the IMIB Strategic Plan 2019-2023.
- › Selection of Committee members and internal operations based on the requirements listed on the Technical Guide for evaluations of the ISS and the needs of the institute.

- › Review and edition of the IMIB Quality Management System documents (Quality Policy, Quality Plan, Guide or internal code on good scientific practices, integrity and research ethics).
- › Active collaboration with the Internal Scientific Committee and other Institute Committees and Central Core Facilities.
- › Identification and establishment of channels for information and dissemination of the Quality Policy.
- › Participation to improve the quality of the researchers of the Institute.

During this period the Quality Committee:

- › Held five follow-up and review meetings (on site and online) and one with the IMIB Central Core Facilities Committee.
- › Reviewed ten documents submitted by other Committees, Support Units and Central Core Facilities related to quality issues.
- › **Promoted quality** among researchers distributing the IMIB Policy and Quality Plan (meetings with the Areas and at the IV Scientific Conference of the IMIB, held on 11/11/2019, with the attendance of **182 researchers** of the institute
- › Identified four quality training activities based on the needs of researchers and other professionals. These activities are suitable to be included in the IMIB 2020 Training Plan.



# **GROUPED RESEARCH ACTIVITY**

# **COMMUNICATION**

# COMMUNICATION COMMITTEE

At this point, we have been able to show that as institution we are capable of transferring our knowledge and also that we are working to be innovative in the biomedical field. All our activity is based on quality principles and good practices. We train our personnel in research and biomedical innovation, but are we able to communicate our progress to society? Have we contributed to the scientific dissemination of our research? Let's see some data:

In 2019, a Communication Committee was created, with representatives from the UMU, SMS, the IMIB management body, and the company hired to manage the Institute's Communication strategy.



During 2019, the committee have met on two occasions, and the members were in permanent contact.

The commission is made up of seven members, of which five are women (71%)

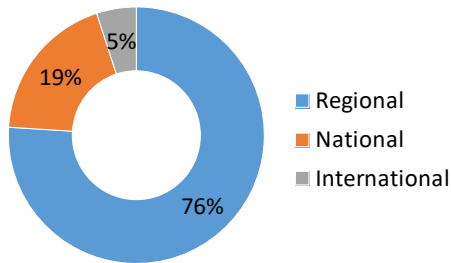
The following actions have started this year, in order to promote dissemination of the Institute's activity in society.

## **BROADCAST IN THE MEDIA**

This year the IMIB has published a total of 165 press releases mainly related to advances achieved by professionals of the institute. Some of the press releases were used to promote conferences and activities organized by the institute and to publish the expert's opinion in relevant topics.

The total number of published news represented an increase of 1,078% compared to the previous year. The national audience had a higher interest in diffusion of scientific knowledge as seen for example in publications in SINC Agency or El País. In particular, 31 national articles (19%) and 8 international articles (5%) were published in 2019.

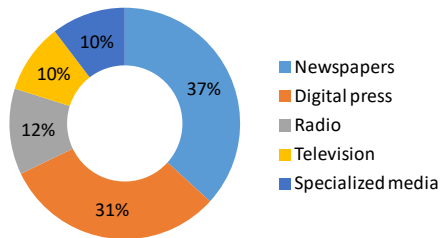
**SCOPE OF DISEMINATION**



The type of media where the news were mainly published were printed press, 64 articles, and online press, 54 articles. The IMIB was present in 17 news programs on regional and national TV channels. During this year, 21 news were broadcast in the radio with projects, progress and events related to the IMIB.

Much of the published content has also appeared in specialized health media, such as “Diario Médico” or “Infosalud”, with 18 published articles.

**BROADCAST MEDIA**



The Communication team sent 22 press releases / communications and held five meetings with the media or invitations to cover events of the IMIB.

**SOCIAL MEDIA**

During 2019, the social network activity of the IMIB focused on three channels: Twitter, Instagram and YouTube.

The account @IMIB\_Arrixaca, created in November 2018, grew throughout 2019 with an increase of 767 and reaching the 1,000 followers. The average number of tweets during this period has been 55.44 per month. Most of them have focused on publicizing the research of

scientists from the institute, awarded prizes, information about conferences and seminars held, and presence in the media.

This channel helped to boost feedback from IMIB members and to get closer to society. The average monthly prints of the published content has reached an impact of 51,716.

During this period, the IMIB launched the ‘Ponnos Cara’ campaign. In this campaign, the IMIB released a set of videos to promote the feeling of inclusion of researchers and publicize their research lines, both externally and internally. These videos have been published in the YouTube channel, Twitter and Instagram, and it also has its own section within the institutional website.

The **Instagram** account @imibarrixaca was created on January 3, 2019 with the objective of extrapolating the research generated by the institute to a visual format. This channel provides information on the latest advances developed by the center’s research groups and interventions in the media. The Instagram account has played a key rol in knowing members of the institution. During 2019, the account reached 400 followers.

Regarding **YouTube**, a total of 54 videos were filmed aimed at promoting research by scientists of the institute and the “ponnoscara” section. Two special campaigns were also launched: a video to publicize what the IMIB, including contributions from the scientific director and the scientific deputy directors with 426 visualizations and a special video for the International Day of Women and Girls in Science. In this video, different researchers from the center were filmed while they answered questions from a group of girls interested in science. This clip has generated great success with more than 2,000 visualizations and were of particular interest for the regional media such as Channel 7 TV Región de Murcia or the newspaper La Verdad.

All the relevant content published on social networks, as well as the press releases, have been included weekly on the website of the institution. The website was constantly updated with the latest research from the institution, contributions from the institute, as well as other activities different to the previously listed.

SUMMARY OF COMMUNICATION DATA IN 2019

|  |           |                   |
|--|-----------|-------------------|
| NUMBER OF COMMUNICATION SESSIONS CARRIED OUT | 5         |                   |
| NUMBER OF PRESS RELEASES                     | 165       | 126 REGIONALES    |
|  |           | 31 NACIONALES     |
|  |           | 8 INTERNACIONALES |
| NUMBER OF NEWS PUBLISHED IN WRITTEN PRESS    | 64        |                   |
| NUMBER OF NEWS PUBLISHED IN DIGITAL PRESS    | 54        |                   |
| NEWS IN OTHER AUDIOVISUAL MEDIA (RADIO, TV)  | 38        | 21 RADIO          |
|  |           | 17 TV             |
| AVERAGE NUMBER OF TWEETS/MONTH               | 55        |                   |
| INCREASED TWITTER FOLLOWERS                  | +767      |                   |
| NUMBER OF VIDEOS BROADCAST ON YOUTUBE        | 54        |                   |
| INCREASED INSTAGRAM FOLLOWERS                | +400      |                   |
| NUMBER OF UNIQUE VISITS TO THE IMIB WEBSITE  | 371.489   |                   |
| IMB WEB SITE RESOURCES EXPLORED              | 5.671.975 |                   |

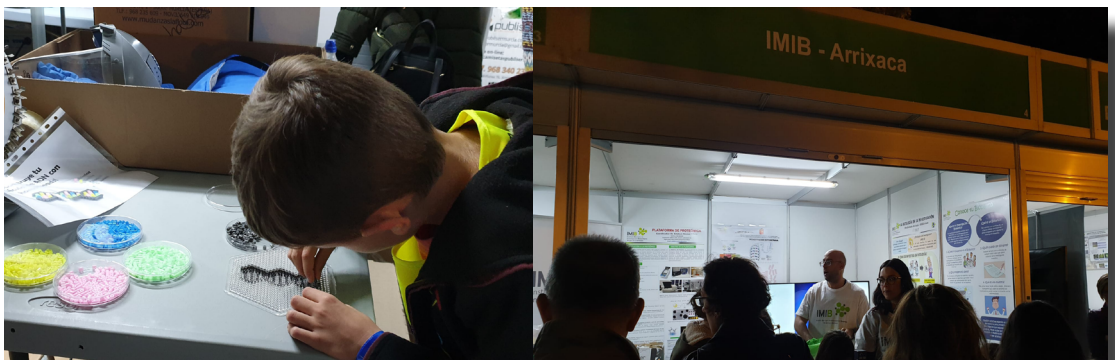
**DISSEMINATION AND COMMUNICATION OF SCIENTIFIC KNOWLEDGE**

On November 11, the IV IMIB Scientific Conference took place in the Archivo General de la Región de Murcia. During the conference, researchers from the institute, both established and in training, presented their results in oral communications. Prizes were also awarded to young researchers at the IMIB and to the best theses of the institute defended in 2018. During the sessions, there was also the opportunity to create collaborations and ask questions at the coffee and lunch breaks. In summary, we share an entire day with all those who register: scientists, students, society in general ...





As part of the IMIB's strategy to disseminate research and the institute, for the first time set up a stand at the 18th edition of the Science and Technology Week in the Region of Murcia organized by the *Consejería de Empleo, Investigación y Universidades* and the *Fundación Séneca*. In this stand, professionals of the Central Core Facilities, talked to citizens, especially children, teaching them different techniques, using even colored sweets for this. As part of the activity, workshops, experiments and demonstrations were carried out free of charge to encourage young people to develop a career in science and technology and to familiarize with the scientific activity of the region explained in simple terms.





# CENTRAL CORE FACILITIES AND INFRASTRUCTURES

The system of Central Core Facilities for research support of the IMIB is made up of the **8 Transversal Units dependent on the SMS and attached to the Institute, and the 11 centralized units of support for biohealth research provided by the Scientific Area and Research Technician (ACTI) from the UMU**. The human and material resources of the Central Core Facilities offer the ideal conditions to guarantee a research of excellence in the biomedical field. The staff members of the Central Core Facilities are highly qualified and accumulate extensive experience in providing research services, especially some ACTI units have more than 35 years of service within the UMU.

The IMIB Central Core Facilities depend on the IMIB Governing Board and they work in coordination under the direction of the Board of Directors executed by the **scientific deputy directors** of the institute Dr. Pablo Pelegrín Vivancos (Deputy Scientific Director for basic research, pablo.pelegrin@imib.es) and Dr. Jose Luís Alonso Romero (Deputy Clinical Scientific Subdirector, josel.alonso2@carm.es). The Central Core Facilities also work with the support of the managers of the different Central Core Facilities, represented by the Plataforms Coordination, since in 2019 Dr Teresa Escamez Martínez is responsible (coordinacionplataformas@imib.es) with the administrative support of Fátima Hernández Montesinos (Attached to the Technical Subdirectorate of the IMIB, fatima.hernandez@imib.es).

ACTI units are dependent of the UMU Vice-Rectorate for Research (Vice-Rector, Francisco Esquembre Martínez (vicinves@um.es) and work in coordination under the direction of Roque J. Ortiz González (Head of Area, roque@um.es) and María Teresa Castells Mora (Deputy Head of Area, castells@um.es), with the administrative support of Encarnación Yelo Carrasco (responsible, Head of Business, yelo@um.es), Pedro Valera Pérez (Administrative, pvp@um.es), and Manuel Carlos Baños Celdrán (Administrative Assistant, mcbc@um.es).

The IMIB Central Core Facilities provided by the SMS are organized in the following units:

- › SPF Animal Facility Central Core Facility
- › Biobank Central Core Facility
- › Clinical Trials Central Core Facility
- › Genomics Central Core Facility
- › Biomedical and Bioinformatics Computing Central Core Facility
- › Pathology Central Core Facility
- › Proteomics Central Core Facility
- › White Room Central Core Facility

The following IMIB Central Core Facilities are part of ACTI:

- › Tissue Culture Central Core Facility (SCT)
- › Animal Experimentation Central Core Facility (SEA)
- › Scientific Instrumentation Central Core Facility (SUIC)
- › Microscopy Central Core Facility (SUM)
- › Image Analysis Central Core Facility (UPS)
- › Statistical Support Central Core Facility (SAE)
- › Molecular Biology Central Core Facility (SBM)
- › Biotechnology Central Core Facility (SEAF)
- › Psychological Instrumentation Central Core Facility (SUIP)
- › Radioprotection and Waste Central Core Facility (SRR)
- › Central Core Facility for Research Support Workshops (TAI)



The structure and running, location, facilities, service portfolio and activities of each of the IMIB Central Core Facilities during 2019 are detailed below:



Bioscience Research Laboratories Building (LAIB).

# CLINICAL TRIALS CENTRAL CORE FACILITY

## CONTACT

Dr. Lola Serna Guirao: lola.serna@carm.es. Phone: 968359763  
María Muñoz García: maria.munoz@imib.es. Phone: 968381290

## OVERVIEW

The IMIB Clinical Research and Clinical Trials Unit, as a transversal Central Core Facility of the Institute, offers its services to researchers interested in conducting clinical trials (with drugs and medical devices) and post-authorization studies, to comprehensively support clinical independent research or research from a non-commercial sponsor.

The Clinical Research and Clinical Trials Unit of the IMIB is part of the the Spanish Clinical Research Network: SCReN.

SCReN is linked to the European network ECRIN (European Clinical Research Infrastructures Network) which facilitates participation in international clinical research studies. It is a network that facilitates adequate planning of tasks, manage new challenges, and propose improvements in health strategies and optimal usage of health resources to obtain results leading to scientific progress, improvements in patient health and the health system.

## ORGANIZATIONAL STRUCTURE, MEMBERS, ROLE

Group Leader.:

› Dr. Lola Serna Guirao, director

Team:

- › María Muñoz García, deputy director, Project manager
- › Virginia Hurtado Hernández, Clinical Trial Monitor
- › Dr. Cristina Fuente Mora, Clinical Trial Monitor
- › Alba Sánchez Ibáñez, Administrative support
- › Rosario García Gómez, Clinical Trial Monitor

## RUNNING OF THE FACILITY

The Central Core Facility provides personalized support and service to groups interested in conducting clinical trials (with drugs and medical devices) and post-authorization studies, both IMIB and non-IMIB, within the non-commercial scope.

The aim of the Central Core Facility is to support research groups interested in conducting clinical research studies, covering all phases of the studies, from counseling, to commissioning, implementation and close-out.

Some of the Central Core Facility activities include providing support in the preparation of the study protocol, methodological support, application and paperwork submission to the AEMPS and CEIm, monitoring and the preparation of safety and final reports. The idea of the Central Core Facility it is also to provide visibility to the ideas that arise to many professionals in clinical practice, giving them the support for these ideas to turn into clinical research studies, with an adequate level of quality, in compliance with Good Clinical Practice and the current legislation. The Central Core Facility also performs pharmacovigilance of trials if required.

## LOCATION

Clinical Trials Central Core Facility  
Virgen de la Arrixaca Clinical University Hospital  
1<sup>st</sup> Floor Polyclinic. AECC-IMIB Building  
Ctra Madrid-Cartagena s/n 30120  
El Palmar Murcia  
968381290-Fax 968381289

## SERVICE PORTFOLIO

### MONITORING

- Notification of clinical trial initiation to the AEMPS and CEICs.
- Preparation, development and report of the Initiation visit by center.
- Preparation, development and report of the Pharmacy Initiation Visit.
- Maintenance of documentation during the study.
- Online monitoring per center / year.
- Preparation, development and report of periodic monitoring visit.
- Preparation of Pharmacy visit, drug accounting and visit report.
- Preparation and development of research team meetings.

### SUPPORT IN PRE-INITIATION TASKS OF CLINICAL TRIAL

- Review of draft protocol.
- HIP-CI review.
- Preliminary study of the pilot project.
- Request for insurance quote.
- Design, elaboration or adaptation of protocol and case report forms.
- Forecasting of resources / costs / hours of work.

### PROJECT MANAGEMENT

- Request for Clinical Trial Management.
- Project follow-up by centers.
- Documentation follow-up by centers.
- Preparation of periodic Newsletters.
- Preparation of documentation to request protocol amendments.
- Preparation of amendments to include more centers.
- Submission of documents to the AEMPS and CEICs.

Economic and administrative payment management, CRO control etc.  
Control and management of complementary tests, medication shipments etc.  
Writing annual study reports.  
Processing and sending annual reports to AEMPS / CEIC / CCAA.  
Annual Safety and Monitoring Report. DSUR

### **STUDY CLOSURE**

Preparation, development and report of the close-out visit.  
Pharmacy close-out visit.  
Notification of AEMPS and CEIC of the final close-out.  
Medication reconciliation.  
Writing the study final report.  
Results.

### **PHARMACOVIGILANCE MONITORING**

Updating the reference safety information of the drugs used in the Clinical trial.  
Management of the SAE, SUSAR, expedited notification and registration.  
Drafting of annual safety reports.  
SAE Reconciliation.  
Processing / sending reports to AEMPS and CEIC.

## **ACTIVITIES 2019**

In 2019, the Central Core Facility has managed / processed 26 clinical trials, many of them multicenter. The IMIB is leader of four studies at national level (Immunotolerance, EVENTS, STATIN and COLICA). Of all the managed studies, three have started in 2019 and two of them are multicenter:

TCIM ELAII: Phase II clinical trial of intramuscular infusion of autologous bone marrow stem cells in patients with Amyotrophic Lateral Sclerosis. Multicenter

GUARDS: Ursodeoxycholic acid as a novel treatment for gestational / type 2 diabetes diagnosed at 24-38 gestational weeks.

COLICA: Randomized, double-blind study to assess the benefit of Colchicine treatment in patients with acute HF. Multicenter.

Some staff members of the Central Core Facility have participated as speakers in the Good Clinical Practice course organized by the IMIB, as well as in the Seminar “Research Methods and Techniques in Nutrition” at the University of Murcia.

# PATHOGEN FREE ANIMAL HOUSE (SPF, SPECIFIC PATHOGEN FREE)

## CONTACT

Web: [www.animalario.imib.es](http://www.animalario.imib.es)  
Email: [animalario.arrixaca@carm.es](mailto:animalario.arrixaca@carm.es)  
Phone: 968 35 94 49

## OVERVIEW

The Animal Facility, integrated into the Virgen de la Arrixaca Clinical University Hospital, is one of the many Central Core Facilities available to the IMIB researchers, and constitutes a unique tool to promote quality translational research.

Housing animals of uncontrolled microbiological status endangers the animals themselves, many of them genetically modified and of immeasurable value, and puts the research results at risk. If a researcher uses animals of unknown health status, he will be incorporating uncontrolled variables into the experiments with repercussions on biochemical, immunological parameters or histopathological findings, which may lead to a misinterpretation of the results obtained. Generating SPF (Specific Pathogen Free) animals and keeping them in controlled barrier conditions, our researchers will generate valid, reproducible and competitive results.

## ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLES

Facility functions include:

- › To provide the scientific community with the facilities, materials, equipment and animals, necessary for the development of research projects and / or teaching tasks that require the use of health-controlled experimental animals, free of pathogens (SPF), and promote the proper treatment, handling and use of animals for these purposes.
- › Promote the principles of bioethics using as few animals as possible, alternative techniques and refinement in experimental techniques.

Animal Facility Team Members:

- › Four Animal Husbandry Technicians with A, B and C competencies according to Order ECC / 566/2015, of March 20, which establishes the training requirements that must be met by personnel who handle animals used, bred or supplied for experimentation and other scientific purposes, including teaching.
- › One member of staff responsible for the Health and welfare of the Laboratory Animals. Facility Designated Veterinarian. Competencies E and F, Order ECC / 566/2015



## RUNNING OF THE FACILITY

The animal facility is prepared for the housing of mice and zebra fish in pathogen-free conditions and is available for researchers who want to maintain their lines of interest according to the highest international standards in facilities suitable for genetically modified organisms.

Once the researchers have the Favorable Report of the Competent Authority according to Royal Decree 53/2013 (of February 1, which establishes the applicable basic rules for the protection of animals used in experimentation and other scientific purposes, including teaching), and authorization of the Body in Charge of Animal Welfare, they may incorporate modified lines either from a commercial provider or from a scientific exchange collaboration, if they meet minimum sanitary requirements. Thus, depending on the health status of the center of origin, the animals may directly access the Procedures or the General Area. The breeding and stabling of animals in the Barrier zone shall be compulsorily subject to the sanitary embryo transfer.

It is an essential legal requirement for all personnel who wish to work with experimental animals to be in possession of competencies a, b, c of Training Order ECC / 566/2015. On the other hand, through the management computer application, the researchers will be able to check the status of their colonies in real time and will be able to communicate with the technicians responsible for their lines if they wish to request different services: crosses, weaning, samples for genotyping, slaughter, etc.

## LOCATION AND FACILITIES

The Animal Facility is included in the grounds of the Virgen de la Arrixaca University Hospital and houses areas for small rodents (mouse) and zebrafish. The building has three levels:

- › The warehouses and one laboratory are located on the ground floor to perform in vivo luminescence / fluorescence studies and to irradiate.
- › Floor 1 has the facilities for breeding and housing the mice in pathogen-free conditions, and has four zones: Washing and sterilization, Barrier, Procedures and Quarantine for derivations.
- › Floor 2 includes the technical area, two laboratories for terminal procedures, the zebrafish area and a small administrative and training area for facility workers and users.

In addition, next to the main building, we can find the zebrafish quarantine and filtration rooms. This area includes two independent rooms: a) a quarantine area for animals coming from scientific exchanges until the health status is confirmed; and b) the filtration and maintenance equipment of the facility with real-time monitoring of the water conditions (pH, conductivity, etc)

## CARTERA DE SERVICIOS

### RODENTS

- › Management of colonies in pathogen-free conditions: isolated or recurrent crossings, females of known gestational age, weaning, animal identification, backcrossing, collection of samples for genotyping, etc.
- › Supervision of animal welfare and health after procedures. Post-operative resuscitation in an intensive care chamber.
- › Technical advice and experimental support: control of genetic drift and point mutations in genetically modified lines, model selection, anesthetic protocols, surgical techniques, treatments, paperwork from the competent authorities.
- › Ethical advice for completing the report of the designated Body for the evaluation of projects and the Competent Authority.
- › Specific training of competencies a, b and c required to obtain the Job Under Supervision (Training Order ECC / 566/2015) in the group of rodent species.
- › Embryo transfer to obtain genetically modified pathogen-free lines.
- › Preparation and supply of anesthetic mixtures and medicated nutritional support (analgesic / anti-inflammatory).
- › Luminescence and fluorescence analysis of small animals (mouse) in vivo.
- › Gamma-ray irradiation for small animals, blood samples and cell cultures (2.5-6 Gy / min)
- › Delivery of animals and sacrifices.
- › Real-time animal database: crosses, births, weaning, slaughter, alerts, lists of animals with filters by line, age, sex, genotype, incidents animal welfare, request for services, reservation of equipment and rooms, etc.

### ZEBRA FISH

- › Breeding and production of zebrafish.
- › Unit of Scrutinies and Tests in vivo.
- › Gene inactivation or overexpression assays in larvae requested by the researchers.
- › Ethical advice for fulfilling the report of the Authorized Body for the evaluation of projects and the Competent Authority.
- › Genetic characterization.
- › Forced swimming unit.
- › Fluorescence analysis.
- › Specific training of the competencies a, b and c required to work under supervision (Training Order ECC / 566/2015) with aquatic animal species.

## ACTIVITIES 2019

During 2019, the following IMIB groups required services from the Animal Facility:

- › Hematopoietic Transplant / Cell Therapy.
- › Gastrointestinal Surgery, Endocrine and Abdominal Organ Transplantation.
- › Clinical and Experimental Cardiology.
- › Pediatric research.
- › Brain regionalization and developmental genes.
- › Control molecules of proliferation and differentiation.
- › Hematology and experimental clinical oncology.
- › Molecular Therapies and Biomarkers of Solid Tumors.
- › Immunology and Immunotolerance in Transplants and Immunologically Based Diseases.
- › Clinical and Experimental Neuroscience.
- › External groups:
  - › Center for Edaphology and Applied Biology of Segura (CEBAS) of the CSIC.
  - › Radiopharmacy Service of the Virgen de la Arrixaca Clinical University Hospital.
  - › Neurotransmission, Neuroprotection and Neuroinflammation Group. Autonomous University of Madrid.

In addition and during 2019, the Pathogen Free Animal Facility organized the following activities:

1. Initiation of the activity of the Authorized Body for the Evaluation of IMIB Projects.
2. Zebrafish Stand at the Science and Technology Week in the Region of Murcia.

# GENOMIC CENTRAL CORE FACILITY

## CONTACT

Director: Dr. Ana Isabel Antón  
Laboratories 0.16 / 0.24, LAIB building  
Phone: 868 88 5003  
Health Sciences Campus  
Carretera Buenavista s/n  
30120, El Palmar (Murcia)  
Email: [genomica@imib.es](mailto:genomica@imib.es); [ana.i.anton@carm.es](mailto:ana.i.anton@carm.es)  
Web: [www.genomica.imib.es](http://www.genomica.imib.es)

## OVERVIEW

The Genomics Central Core Facility is a central research infrastructure that provides access to a wide range of molecular techniques currently in demand in biomedical research.

The services are offered on a priority basis and with minimal costs to researchers at the IMIB and the University of Murcia.

The services of the Central Core Facility are also available to other public institutions or private companies.

## ORGANIZATIONAL STRUCTURE, MEMEBERS AND ROLES

The members of the genomics Central Core Facility are four doctors and one specialized technician. All personnel of the Unit guarantee a comprehensive service to support the molecular research of the IMIB groups.

**Dr. Ana Isabel Antón:** Director. Coordination, planning and management of the Central Core Facility. Interpretation of results and implementation of new techniques and applications. Promote and disseminate the Central Core Facility's services, collaborating with researchers in the development of projects. Training of Central Core Facility staff and undergraduate and post-graduate students.

**Dr. Beatriz Revilla.** Doctor Senior Technician for Research Support, serving as Deputy Coordinator and Head of Purchasing. Guarantees the proper development of procedures and implementation of services. Interpretation of results and preparation of reports. Ensures the availability of materials and means for the proper performance of services. Training of staff and undergraduate and postgraduate students.

**Dr. Antonio Parrado.** Head of Quality and responsible of the microarray section. Organizes and develops a quality system in the laboratory in compliance with the principles of good

laboratory practice and quality guidelines of the Institute. It ensures that the quality program is applied to all procedures and by all Central Core Facility staff. Training of staff and undergraduate and postgraduate students.

Dr. Natalia Ruiz Lafuente. Technical Personnel to Support the Infrastructure Research of MINECO. Implementation of general techniques and analysis of results. Ensures maintenance and registration of paperwork for all projects and their development.

Noelia Navarro: Level FPII Technician specialized in molecular techniques. Implementation of general techniques and maintenance of the laboratory. Ensures that laboratory supplies meet the required standards for their use. Responsible for waste disposal.

In addition, as an external laboratory, the Biochemistry and Clinical Genetics Center located in the maternity and infant section of the Arrixaca Hospital (floor -2) is also part of the Central Core Facility. The person in charge is Dr. Isabel López Expósito and it is integrated by 6 other doctors.

This group provides specific services that can only be performed by specialized staff (such as cytogenetics) and allows access to their equipment, as long as it is not in use for diagnosis.

## RUNNING OF THE FACILITY

The Genomics Central Core Facility provides consulting on design and planning of experiments. Firstly, the needs of the project are defined with researchers and a budget is drafted. Once accepted, the staff of the Central Core Facility is responsible for the execution of the experiments.

The qualified staff of the Central Core Facility validates and technically analyzes the results, however, the biological interpretation corresponds to the researchers.

Some instruments and analytical tools are available free of charge, always under supervision and support from the Central Core Facility personnel.

## LOCALIZACIÓN E INSTALACIONES

Laboratories 0.16, 0.24, 4.13 y 4.14 LAIB Building.  
Health Sciences Campus  
Carretera Buenavista s/n, 30120 El Palmar (Murcia)

## SERVICE PORTFOLIO

### Quality analysis of nucleic acids

Measurement of fragment size, quantity and quality of DNA and RNA using a microfluidic electrophoretic system of high-resolution and sensitivity in the Bioanalyzer 2100 (Agilent Technologies)

### **REAL TIME PCR**

Real-time PCR is the most sensitive method to detect and quantify nucleic acids. Even with a small amount of mold, the system guarantees high sensitivity, specificity and efficiency.

The Genomics Central Core Facility has available QuantStudio 5 equipment (Applied Biosystems) with a 384-well block, six excitation and six emissions filters. The filters offer 21 different color combinations, allowing a wide range of fluorophores and maximum multiplexing. In addition, connecting to Thermo Fisher Cloud give access, share and analyze data anytime and from any location.

#### Applications

- › Gene expression studies (mRNA)
- › Analysis of genetic variation (genotyping of SNPs and mutations detection, Genotyping of Drug Metabolism Enzymes, Copy Number Variation Analysis)
- › Profiling and quantification of microRNAs
- › Long Noncoding RNA Expression (lncRNA)
- › Pathogens detection and quantification of viral load
- › Specific detection of amplicons

### **SANGER SEQUENCING**

Some of the possible uses of the genetic analyzer are DNA sequencing, mutation-specific detection and fragment analysis for human identification, microsatellite analysis, Quantitative Fluorescence PCR (QF-PCR) and Multiplex Ligation-dependent Probe Amplification (MLPA).

### **MASSIVE SEQUENCING**

Massive sequencing allows simultaneous sequencing of large numbers of samples or genes efficiently, quickly and inexpensively. The use of personal Genome Machine PGM (Ion Torrent) technology is available.

The service provides full technical support on the following tasks:

- › Advice on the strategy to be developed according to the needs of the project, personalized design and drafting of a budget.
- › Preparation of samples (libraries) for sequencing.
- › Quality controls throughout the whole massive sequencing process.
- › Implementation of the massive sequencing technique.
- › Primary and secondary bioinformatic analysis of the obtained data.

#### Applications

##### **1. Directed sequencing**

- a. Predesigned and validated DNA and RNA panels in multiple research areas for the detection of variants in germline and somatic analysis.
- b. Setup of DNA panels for research of human diseases using a optimized gene catalog

for germ analysis.

- c. Customized design of panels on any organism to sequence genes, regions, hotspots, expression analysis or detection of fusion genes.
- d. . HD panels: High sensitivity tests (LOD <0.1%) for liquid biopsies and somatic oncology.
- e. Oncomine panels: analysis of SNVs, indels, CNVs and fusion genes in a single run.

## 2. Sequencing of microorganisms:

- a. Analysis of Bacterial diversity by 16S rRNA sequencing.
- b. Analysis of genetic diversity in a sample, including bacteria, archaea and fungi.
- c. Bacterial strain sequencing.

## PYROSEQUENCING

Quantitative analysis of specific CpG sites methylation in any genome is performed by pyrosequencing with the Pyromark Q24 system (Qiagen). Predefined or newly designed assays are used by Pyromark Assay Design Software (Qiagen). Along with the experimental samples, 100% methylated and unmethylated DNA controls are included. Prior to pyrosequencing, sodium bisulfite treatment is performed for the conversion of the unmethylated cytosines to uracils, followed by amplification of the target fragments by PCR using specific primers. Bisulfite conversion and PCR are included in the service.

## MICROARRAYS

The unit has a Hybridization and analysis of DNA microarrays Central Core Facility (Agilent Technologies) equipped with DNA Microarray Scanner and with SureScan High Resolution Technology (3 µm). Agilent microarrays consist of glass slides with thousands (K) of printed DNA probes (Agilent 60-mer SurePrint Technology) corresponding to the genes of a particular species, and allow quantification of the nucleic acids (DNAs or RNAs) present in the experimental samples, they are fluorescently labeled by hybridization with the probes. Each microarray is for a single sample and for single use only. Microarrays are designed depending on the application and the species.

The Genomics Central Core Facility provides full technical support in:

- › Study design and budget.
- › RNA extraction from the samples (optional).
- › Labelling of samples and quality control of the process.
  - Hybridization of the microarrays labelled samples, scanning and data extraction.
  - Analysis of differential expression and enrichment (optional).

### Applications

- › Gene expression
- › Expression of miRNAs
- › Methylation
- › Analysis of Splicing variants

## CYTOGENETICS

- › Fluorescent in situ hybridization (FISH) in cell extensions.
- › Karyotyping
- › Comparative Genomic Hybridization Microarrays (CGH)

## ACTIVITIES 2019

### **1. IMPLEMENTING NEW APPLICATIONS AND TECHNIQUES**

- › Analysis of bacterial diversity based on 16S rRNA sequencing
- › Full sequencing of a bacterial genome.
- › Setting-up new equipment provided by Werfen (RotorGene, Qiagility and Pyromark 24), once completed the necessary installation and training courses

### **2. DEVELOPMENT OF RESEARCH PROJECTS**

- › Massive sequencing with previous panels: 8 projects with 380 samples
- › Development of new massive sequencing panels: 51 samples.
- › Analysis of 6 projects for the analysis of bacterial diversity in samples from several tissues such as intestine and skin of zebrafish, cow rumen, pig intestine, faeces and intestines of gilthead bream and human faeces and exudates. Overall, bacterial diversity has been studied in approximately 350 samples. This technique has developed an exponential increase during 2019.
- › Gene expression studies in 3 projects, evaluating a total of 390 samples.
- › Study on specific amplicon detection in 585 samples.
- › Microarray project to analyse 384 microRNAs samples
- › Initiation of a project of 400 samples on analysis and quantification of methylated areas directed by pyrosequencing.
- › Development of several Sanger sequencing projects in 52 samples
- › In addition, we draft multiple budgets that may not be requested later.

### **3. GROUPS THAT USED OUR FACILITY IN 2019**

#### ***IMIB Groups:***

- › Area 1. Clinical-Experimental Hematology and Oncology. Clinical Genetics. Hematology and Clinical-Experimental Medical Oncology Group: 8 projects performed on massive sequencing, in addition, the Central Core Facility drafted several budgets for the group of molecular therapies and biomarkers for solid tumors for gene expression and sequencing studies (Sequence panel design).
- › Area 2. Cardiovascular and Respiratory Diseases. Clinical and Experimental Cardiology Area 2. Cardiovascular and Respiratory Diseases. Pediatrics Research Group: 1 miRNA microarray project.
- › Area 5. Epidemiology, Public Health and Health Services: 1 project of Methylation by pyrosequencing.
- › Area 3. Digestive and Endocrine-Metabolic Diseases: 1 ongoing sequencing project



massive and another of gene expression.

- › Area 1. Clinical-Experimental Hematology and Oncology. Clinical Genetics. Hematopoietic Transplantation / Cell Therapy: 1 project to detect specific amplicons using real-time PCR.
- › Area 4. Neurosciences and Sense Organs. Experimental Ophthalmology Group.
- › Area 6. Immunology, Microbiology and Infectious Diseases. Clinical Microbiology and Tropical Medicine Group: 2 Sanger Sequencing project and one Metagenomics project.
- › Area 6. Immunology, Microbiology and Infectious Diseases. Group. Immunity, Inflammation and Cancer Group: 2 metagenomics project, 1 gene expression project.
- › Cardiovascular and Respiratory Diseases. Group. Medical Physiology Group: 2 gene expression projects.
- › Area 6. Immunology, Microbiology and Infectious Diseases. Morphofunctional cell and tissue integration group: 1 massive sequencing project from custom panel hotspots.

#### **UMU Groups:**

- › Biology of Reproduction.
- › Department of Genetics and Microbiology: 1 *Myxococcus xanthus* Sequencing project.
- › Animal Production Department: 3 Metagenomics project.
- › Department of Cell Biology and Histology.
- › Department of Pharmacology.
- › Department of Ophthalmology: Sequence panel design.

#### **4. TRAINING ACTIVITIES**

- › **Science and Technology Week (SeCyT):** This year the Genomics Central Core Facility together with other IMIB Central Core Facilities, participated in SeCyT organized by the Seneca-Science and Technology Agency Foundation, representing IMIB. Some activities were as fun as: “discover your own DNA”, where it was possible to visualize the DNA molecule applying a simple technique and understanding the process required for extraction or “Build your DNA molecule” allowing you to build your own DNA molecule based on your physical characteristics such as eye color, hair color, height, lip shape and dominant hand. Writing down the complementary sequence with these characteristics that would later be transferred to nucleotides using jelly beans
- › **Extracurricular internships** in Biology and Biochemistry degrees from the University of Murcia. Two students were trained in genomic techniques, with the completion of final work supervised by the responsible person of the Central Core Facility.
- › Internship and training of two Laboratory Technicians from the “**Instituto Claudio Galeno**”.

#### **5. APPLICATIONS**

- › Call for 2019 MINECO scientific-technical equipment for a high-performance, massive sequencing team. Negative resolution.

- › Support for Technical personnel 2019. Currently under review.

## **6. SUBCOMMITTEES**

- › Foundation and participation in the Quality Subcommittee for IMIB Central Core Facilities.

## **7. PUBLICATIONS WITH A SECTION THANKING THE GENOMICS CENTRAL CORE FACILITY**

Archeogenetics of F11 p. Cys38Arg: a 5400-year-old mutation identified in different southwestern European countries.

de la Morena-Barrio ME<sup>1</sup>, Salloum-Asfar S<sup>1,2</sup>, Esteban J<sup>3</sup>, de la Morena-Barrio B<sup>1</sup>, Altisent C<sup>4</sup>, Martín-Fernández L<sup>5,6,7</sup>, Gueguen P<sup>8</sup>, Padilla J<sup>1</sup>, Miñano A<sup>1</sup>, Parra R<sup>4</sup>, Vicente V<sup>1</sup>, Vidal F<sup>5,9,10</sup>, Bauduer F<sup>11</sup>, Carbonell P<sup>12</sup>, Corral J<sup>1</sup>.

Blood. 2019 Jun 13;133(24):2618-2622. doi: 10.1182/blood.2019000055. Epub 2019 May 1. PMID: 31043424

Systemic and Intravitreal Antagonism of the TNFR1 Signaling Pathway Delays Axotomy-Induced Retinal Ganglion Cell Loss.

Lucas-Ruiz F, Galindo-Romero C, Salinas-Navarro M, González-Riquelme MJ, Vidal-Sanz M, Agudo Barriuso M.

Front Neurosci. 2019 Oct 15;13:1096. doi: 10.3389/fnins.2019.01096. eCollection 2019. PMID: 31680831

Neuronal Death in the Contralateral Un-Injured Retina after Unilateral Axotomy: Role of Microglial Cells.

Lucas-Ruiz F, Galindo-Romero C, Rodríguez-Ramírez KT, Vidal-Sanz M, Agudo-Barriuso M.

Int J Mol Sci. 2019 Nov 15;20(22). pii: E5733. doi: 10.3390/ijms20225733. PMID: 31731684

# PATHOLOGY CENTRAL CORE FACILITY

## CONTACT

Director: Dr. Carlos Manuel Martínez Cáceres  
Pathology Central Core Facility.  
Murcian Institute of Biosanitary Research (IMIB)  
LAIB Building- Crta. Buenavista s/n, Campus CC de la Salud, 4ª Planta, Lab. 4.19  
30120-El Palmar (Murcia).  
Phone: 868885037  
E-mail: carlos.martinez@imib.es, patologia@imib.es  
Web: <http://www.patologia.imib.es>

## OVERVIEW

The Experimental Anatomical Pathology Central Core Facility started the activity in 2012 performing analysis of lesions (macroscopic, microscopic and / or ultrastructural) of the multiple preclinical experimental models developed by the researchers. The goal is to compare these analysis with the data collected from other fields (chemical, biochemical or molecular) to obtain solid, objective conclusions, and with translational potential. The Central Core Facility therefore, constitutes a valuable transversal tool that complements and enhances the research capacity of any group, regardless of the affiliation (IMIB, Public Research Services or private entities).

## ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLES

### Structure

The Central Core Facility is organized in a single Service, divided into different areas depending on the requested service:

- 3.1. Scientific advice for projects.
- 3.2. Histology techniques.
- 3.3. Routine, structural and histochemical staining.
- 3.4. Immunohistochemistry and special techniques.
- 3.5. Immunohistopathological analysis on demand.

### Members

Dr. D. Carlos Manuel Martínez Cáceres. Director.  
Marina Carpes Ruiz. Senior Technician Specialized in Anatomical Pathology

### Tasks

Advice and completion of all kinds of studies related to Pathological Anatomy (macroscopic pathology, histopathology, histochemistry, immunohistopathology, molecular and ultrastructural pathology) of any project involving the use of experimental animal models. In

addition, in collaboration with the Biobank Central Core Facility and the Pathological Anatomy Unit of the “Virgen de la Arrixaca” University Hospital, it carries out studies for Research Projects with samples of human origin of translational nature. Finally, the Central Core Facility establishes technical collaborations with other Central Services according to the needs of the research project.

## RUNNING OF THE FACILITY

The Central Core Facility Hours are from 7:00 to 15:30 Monday to Friday.

The request for services can be made in three ways:

- › Visiting the Central Core Facility location in person within the opening hours.
- › Using the Central Core Facility’s service request system on the website: <http://www.patologia.imib.es/servicios/solicitud/comunes/servicios.jsf>
- › Using the contact email.

Once the request has been made, the Central Core Facility will send a confirmation email to the petitioner with all the details of the service, including a budget and the estimated time to complete it. Once the receipt of the email has been acknowledged and compliance with the conditions of the service has been stated, the Central Core Facility will perform the work within the indicated period. The researcher can at any time know the status of the application, as well as make any changes or request additional services depending on the needs.

Once the work has been successfully completed, the services performed will be billed to the investigator.

## LOCATION AND FACILITIES

The main Laboratory is located on the 4th floor (Laboratory 4.19) of the LAIB building. In addition, it shares spaces in Laboratories 4.30, 4.37 and 4.38.

### **Main equipment:**

- › KOS (Milestone) microwave histological processor.
- › Thermo Histostar paraffin inclusor.
- › Thermo HMS 355S automatic microtome.
- › Shandon Finesse 325 manual microtome.
- › Thermo HM525NX manual cryotome.
- › Cold plates for cutting blocks.
- › Heated flotation baths.
- › Biocare antigenic unmasking chamber.
- › Thermo PT-Link antigenic unmasking chamber.
- › Zeiss AxioA10 emitted light microscope equipped with Zeiss AxioCam 506 digital camera and polarizing module.
- › Olympus Bx41 Emitted Light Microscope.
- › Zeiss Stemi 305 Stereo Magnifier with Built-in Bluetooth Camera.
- › 3D-Histech manual tissue array system.

## SERVICE PORTFOLIO

- › Necropsies of experimental animals.
- › Search and selection of archival samples of human origin (in collaboration with the Biobank Central Core Facility and the Pathological Anatomy Service of the HCUVA).
- › Carving and preparation of histopathological samples for inclusion in permanent medium or cryopreservation.
- › Conventional and special processing, and inclusion in paraffin blocks of fixed samples.
- › Cutting of sections in paraffin or freezing depending on the investigator´s request.
- › Histopathological, structural and histochemical staining.
- › Direct and indirect immunohistochemical staining (ABC, PAP, lectins, colloidal gold) colorimetric, fluorometric or for electron microscopy.
- › Molecular Pathology Techniques applied to slides (colorimetric / fluorometric TUNEL, ISH (on request)).
- › Selection and extraction of samples for molecular studies (in collaboration with the Genomics Central Core Facility).
- › Sampling for ultra-structural analysis (in collaboration with the ACTI Microscopy Service).
- › Performing manual tissue arrays for massive studies (up to 60 tissue samples on a single slide).
- › Advice to Researchers for taking samples, fixing and carrying out Pathological Anatomy studies for Projects, Thesis, TFM or TGF.
- › Performing macroscopic, histopathological, immunohistopathological and ultrastructural analysis.

## ACTIVITIES 2019

### **1. GROUPS THAT REQUESTED OUR SERVICES**

- › Gastrointestinal, endocrine and abdominal organ transplantation (Molecular Inflammation groups (Dr. Pablo Pelegrín Vivancos), Liver Transplantation and HPB Surgery (Prof. Dr. Pablo Ramírez Romero, Prof. Dr. Ricardo Robles Campos, Prof. Dr. Jose Antonio Pons Miñano), Research in Esophageal Diseases (Dr. Pascual Parrilla Paricio) and Veterinary Histology and Pathological Anatomy (Prof. Dr. D. Francisco José Pallarés Martínez)).
- › Hematopoietic Transplantation and Cell Therapy (groups of Drs. Luis Ramón Meseguer-Olmo; David García Bernal; José Luis Alonso Romero; María Clara Ortiz Ruiz; Noemí Marín Atucha and Francisco Javier Rodríguez Lozano).
- › Molecular Control of proliferation and differentiation (Prof. Dr. José Carlos García-Borrón).
- › Morphofunctional integration of cells and tissues (Prof. Dr. Manuel Avilés Sánchez).
- › Biology of Reproduction (Prof. Dr. Emilio A. Martínez García).
- › Molecular therapies and biomarkers for solid tumors (Dr. Juan Cabezas Herrera).
- › Physiotherapy and Disability (Prof. Dr. Francisco Medina Mirapeix).
- › Clinical and Experimental Cardiology (Prof. Dr. D. Domingo A. Pascual Figal).
- › Renal regulation and blood pressure (Prof. Dr. Fco. Javier Salazar Aparicio).
- › Clinical and experimental neuroscience (Prof. Dr. María T. Herrero Ezquerro).

- › External groups: Experimental embryology (IP: Dr. Salvador Martínez Pérez, UHM), Poly (ADP-ribose) polymerases (Dr. José Yélamos, IMIM).

## **2. COLLABORATIONS WITH OTHER IMIB CENTRAL CORE FACILITIES**

- › Biobank Central Core Facility: search and selection of collections (in coordination with the HUCVA Pathological Anatomy Service), reception of samples from projects that involve handling of human samples.
- › Animal Facility Central Core Facility: diagnostic service.
- › Bioinformatics Central Core Facility: collaboration in Research Projects.

## **3. FUNDING, PROJECTS AND R&D CONTRACTS**

Concession in competitive actions of funding for the acquisition of scientific-technical equipment by the Ministry of Science and Innovation to acquire large equipment for the technical improvement of the Central Core Facility.

Concession in competitive actions of a Project in the “Proof of Concept” modality of the Seneca Foundation (in collaboration with the Bioinformatics Central Core Facility and the Pathological Anatomy and General Surgery Services of the HCUVA).

## **4. TRAINING**

### ***Courses assisted:***

- › Courses taken by Central Core Facility personnel: 2.
- › External training exchanges for Central Core Facility personnel: 1 (2 months).

### ***Conducted by Central Core Facility personnel:***

- › Training seminars: 1 (IMIB Seminars).
- › Informative dissemination: participation in the XVIII Science and Technology Week

## **5. OTHER THINGS TO HIGHLIGHT**

Institutional coordination with other IMIB Central Core Facilities: participation in the bi-monthly SMS Central Core Facility Coordination Meetings.

Publications in which the technical or scientific activity of the Central Core Facility has collaborated:

Moreno JM et al. Am. J. Physiol. Renal Physiol. 2019. 316:F332-F340. doi: 10.1152/ajpre-nal.00394.2018.

Carbonell G et al. Plos One. 2019. 14:e0217297. doi: 10.1371/journal.pone.0217297.

Millán-Rivero JE et al. Stem Cell Res Ther. 2019. 10:126. doi: 10.1186/s13287-019-1229-6.

Parrilla-Almansa A et al. Symmetry. 2019. 11:532. doi: 10.3390/sym11040532.

Gil-Martinez AL et al. Neurotoxicity Res. 2019. 35:918-930. doi: 10.1007/s12640-019-0010-z.

Llena C et al. Sci Rep. 2019. 23:7743. doi: 10.1038/s41598-019-44223-1.

Martinez-Fresneda L et al. Reprod Fertil Dev. 2019. 31:1545-1557. doi: 10.1071/RD18511.

Martinez-García JJ. Nat commun. 2019. 10:2711. doi: 10.1038/s41467-019-10626-x.

Valdor R et al. PNAS. 2019. 116:20655-20665. doi: 10.1073/pnas.1903542116.

Galindo-Campos MA et al. Cell Death Differ. 2019. 26:2667-2681. doi: 10.1038/s41418-019-0326-5.



Liquid nitrogen tank

# CLEAN ROOM CENTRAL CORE FACILITY

## CONTACT

Director: Dr. Ana M<sup>a</sup> García Hernández  
Web: salablanca.imib.es  
Email: salablanca@imib.es  
Teléfono: 968381170

## OVERVIEW

The Cell Production Unit of the IMIB is a pharmaceutical-type clean room where advanced therapy drugs and drugs subject to medical prescription such as platelet-rich plasma are produced for clinical use. The opening was authorized by the Spanish Agency for Medicines and Health Products in 2014 and it was later recertified in April 2017. To ensure quality standards, an ex officio inspection from the competent authority takes place with a maximum of three years.

We are part of the Clean Room Central Core Facility of the Spanish Cell Therapy Network RD12 / 0019/0001 (Tercel) together with:

- › CELL PRODUCTION UNIT OF THE SALAMANCA UNIVERSITY HOSPITAL. Technical Manager: Miriam López Parra.
- › CELL THERAPY UNIT OF THE GREGORIO MARAÑÓN GENERAL UNIVERSITY HOSPITAL. Madrid. Technical Manager: M<sup>a</sup> Eugenia Fernández Santos.
- › CIEMAT CELL PRODUCTION UNIT. CLINISTEM. Madrid. Head Technician: Rosa Yáñez González.

The manufacturing operations that we are authorized to perform are:

### ***Manufacturing of advanced therapy drugs***

- › Autologous adult bone marrow mononuclear stem cells not expanded.
- › Cryopreserved allogeneic amniotic membrane.
- › Expanded Autologous adult bone marrow mesenchymal stem cells seeded in tricalcium phosphate (MSC-FTC).
- › Expanded and fucosylated Autologous adult bone marrow stem mesenchymal cells.
- › Expanded and fucosylated allogeneic adult bone marrow mesenchymal stem cells.

### ***Manufacturing of medicines subject to medical prescription:***

- › Autologous platelet-rich plasma.

### ***Other cell therapies***

- › CAutologous bone marrow mononucleated cells for trauma and cardiovascular sur-



gery application.

We offer a comprehensive service that includes scientific advice for the basic development of new therapies, validation of research products and preparation of the require documents for the approval of new research products by regulatory agencies.

Likewise, we offer quality control services meeting the standards of NCF of the European Union and the European Pharmacopoeia: endotoxins. Immunophenotype. Viability and power.

Our work is essential so that the R&D+i cell therapy advances achieved in the Region improves health and quality of life of the population. We facilitate the activity of the other areas of basic and clinical research of the institute, saving time and resources for researchers who request it. In addition, the Central Core Facility has a high level of competitiveness, essential in the search for collaborations with agencies in R&D+i, academic and business at national and international level.

## ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLES

- › Coordinator / Technical manager: Dr. Ana M<sup>a</sup> García Hernández
- › Head of Quality Control: M<sup>a</sup> del Carmen Alguero Martín
- › Production Manager: M<sup>a</sup> del Mar Molina Molina
- › Production technicians: Sandra López Caballero and Inmaculada Mompean Egea

## LOCATION AND FACILITIES

The Clean Room is located in the Virgen de la Arrixaca Clinical University Hospital, in the Hematology Laboratory Unit. The clean room facilities have three production boxes with environmental classification B, completely independent and self-sufficient, each equipped with all the necessary equipment for processing (laminar flow booth, centrifuge, microscope ...) and two boxes with classification C.

## ACTIVITY DURING 2019

### **1. COLLABORATIONS WITH IMIB RESEARCH GROUPS**

- › GI/IMIB/C006/2011: Immunology and Immunotolerance in Transplants and Immunological Bases Diseases, 2 projects.
- › GI/IMIB/C006/2011: Reproductive Physiology and Assisted Reproduction, 1 project.

### **2. COLLABORATION WITH NON-IMIB RESEARCH GROUPS**

Neuroscience Institute UMH-CSIC, University Miguel Hernández of Elche. PI: Dr. Salvador Martínez Pérez.

Josep Carreras Leukaemia Reserach Institute Stem Cell biology, developmental leukemia and immunotherapy Lab. Facultad de Medicina, Universidad de Barcelona.  
IP: Dr. Pablo Menéndez.

Biomaterials for Regenerative Therapies Institute for Bioengineering of Catalonia (IBEC).

PI: Soledad Pérez Amodio

### **3. PARTICIPATION IN ONGOING CLINICAL TRIALS**

- › PIC18/00015 Intramuscular injection of autologous mononuclear cells in ALS patients. A phase II clinical trial.
- › PIC18/00010 NOMA (No More Amputations). N° EudraCT: 018-002653-29.
- › PIC18/00001 Cell therapy for knee osteoarthritis. Comparison of treatments with autologous and allogenic mesenchymal stromal cells in a multicenter controlled randomized clinical trial (ARTROCELL).
- › PI19/00884 Immunology of donor lymphocyte infusión with ex vivo depleted CD45A + T lymphocytes in patients at high risk of viral infection after progenitors allogeneic transplantation.

### **4. PUBLICATIONS DIRECTLY RELATED TO THE UNIT (CELLULAR PRODUCTS, TECHNIQUES, CLINICAL TRIALS ...)**

Safety and Biodistribution of Human Bone Marrow-Derived Mesenchymal Stromal Cells Injected Intrathecally in Non-Obese Diabetic Severe Combined Immunodeficiency Mice: Preclinical Study” Mari Paz Quesada <sup>1</sup>, David García-Bernal <sup>1,2</sup>, Diego Pastor <sup>3</sup>, Alicia Estirado <sup>4</sup>, Miguel Blanquer <sup>1,2</sup>, Ana M<sup>a</sup> García-Hernández <sup>1</sup>, José M Moraleda <sup>1,2</sup>, Salvador Martínez. Tissue Eng Regen-Med. 2019 Jul 26; 16(5):525-538.

Amniotic membrane for the treatment of diabetic foot ulcers. Rodríguez Valiente M. García Hernández A.M., Blanquer M., Almansa Saura S., Bernabé García A., Liarte Lastra S.D. Algueró M.C., Fuente Mora C., Alcaraz P.J., Moraleda J.M., Castellanos Escrig G and Nicolás Villaescusa F.J.XX CONGRESO DE LA SOCIEDAD ESPAÑOLA DE HISTOLOGÍA E INGENIERÍA TISULAR VIII INTERNATIONAL CONGRESS OF HISTOLOGY AND TISSUE ENGINEERING VI CONGRESO IBEROAMERICANO DE HISTOLOGÍA September 4-6, 2019, Murcia, Spain.

XV National Congress of Dermatological Nursing. Cartagena 24-25 October 2019. Cell therapy using amniotic membrane for epithelialization of complex diabetic foot ulcers. Awarded with a prize for research recognition.

### **5. TEACHING ACTIVITY**

Training activity E-19-23216-01 Advanced course of skills acquisition in the management of the patient undergoing hematopoietic stem cell transplantation and immunoeffective therapies 05/21/2019 to 06/05/2019. 1 hour class on cell therapy. Continuous Teaching and Training Unit. Virgen de la Arrixaca University Clinical Hospital. Speaker: Ana M<sup>a</sup> García Hdez.

Training activity E-19-23692-01 Basic course for acquiring skills in the management of patients undergoing hematopoietic stem cell transplantation and immunoeffective therapies 11/12/2019 and 11/27/2019. 1 hour class on cell therapy. Continuous Teaching and Training Unit. Virgen de la Arrixaca University Clinical Hospital. Speaker: Ana M<sup>a</sup> García Hdez.

Advanced Therapies in Inflammatory Bowel Disease. Virgen de la Arrixaca University

Clinical Hospital. Speaker: M<sup>a</sup> del Mar Molina Molina.

Advanced Therapies in Inflammatory Bowel Disease. Virgen de la Arrixaca University Clinical Hospital. Speaker: Ana M<sup>a</sup> García Hdez.

**6. CONTINUING EDUCATION**

Universidad Internacional del Mar “Cell Therapy from the bench to the bedside and return”. Los Alcázares from July 8 to 12, 2019. Duration: 20h. Attendees: Dr. Ana M<sup>a</sup> García Hdez, M<sup>a</sup> del Mar Molina, Inmaculada Mompean, Sandra López Caballero.

Master in quality audit ISO 19011. ESNECA Business School. Duration: 300h. Assistant: M<sup>a</sup> del Carmen Algueró Martin.

Master in quality management ISO 9001: 2015. ESNECA Business School. Duration: 300h. Assistant: M<sup>a</sup> del Carmen Algueró Martin.

Tercel Annual Meeting 2019 28-29 November 2019 (Santiago de Compostela). Training on the NCF Guide to advanced therapy medications given by Matilde Moreno García (Technical Advisor of the Department of Inspection and Control of Medications).

**7. PARTICIPATION IN WORKING GROUPS AND COMMITTEES**

Dr. Ana M<sup>a</sup> García Hernández and Dr. Carmen Algueró Martín are part of the HCUVA “Committee for Advanced Therapies CART cells”.

**8. CLINICAL ACTIVITY**

During this year, the Unit has produced treatment for 287 patients.

# BIOBANK CENTRAL CORE FACILITY

## CONTACT

Director: Dr. Teresa Escamez  
Web: [www.biobanco.imib.es](http://www.biobanco.imib.es)  
Email: [biobanco@imib.es](mailto:biobanco@imib.es)  
Phone: 868 88 50 84

## OVERVIEW

The Biobank is a Central Core Facility that supports translational research managing human biological samples and the associated data used in research, with excellent quality criteria and meeting all the current ethical and legal requirements.

The Central Core Facility is also the Coordinating Node of the Biobank Network of the Region of Murcia, BIOBANC-MUR, registered in the National Registry of Biobanks (ISCIII; B.0000859) and it is a member of the National Central Core Facility of Biobanks Network, RNBB (<http://www.redbiobancos.es>; file PT17/0015/0038).

The main goal is to obtain, process, preserve and transfer all types of human biological samples and associated clinical data. Furthermore, the biobank advises and provides researchers with scientific and technical services. All this, guaranteeing that the rights of the donors are fulfilled working under a quality system. From May 2018, the biobank is certified by the ISO 9001: 2015 standard. In July 2019, this Quality Management System has been recertified.

During 2019, the Central Core Facilities Quality Subcommittee was created, in close coordination with the IMIB Quality Commission, in which the Genomics, Clinical Trials and Biobank Central Core Facilities are also involved. The biobank has collaborated very actively in the institute's re-accreditation process given its experience in this area.

The biobank's activity is based on five main activities:

- › **Technical, ethical and legal advice** for the management of human biological samples in the field of research projects.
- › **Sample and data management:**
  - Sample and data registration in the specific biobank management system developed by the IMIB Biomedical Informatics Central Core Facility.
  - Processing of human biological samples and bio-resources production.
  - Sample storage: Data Matrix system for coded tube storage; OCT tissue frozen block; cryopreservation at -20°C, -40°C, - 80°C and -190°C freezers (liquid and vapor phase nitrogen).
  -

- › **Transfer of biological samples and associated data.**
- › **Safekeeping of collections and sample management outside the biobank.**
- › **Sample processing and molecular techniques (nucleic acid extraction).**

## ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLES

The biobank has a unique organizational structure and decentralized activity organization nodes.

The members are:

- › Scientific Director: Luis García – Marcos Álvarez (Doctor of Medicine and Surgery).
- › Scientific Coordinator: Dr. Teresa Escámez Martínez (Doctor in Biology and Master in Biobanks and Use of human samples in Biomedical Research).
- › Deputy Coordinator: Esperanza García-Molina Sáez (Doctor Molecular Biology and Biotechnology. Responsible for quality and Master's degree in biobanks and management of biological resources for biomedical research).
- › Biobank technicians:
  - Ana Silvente Llorente
  - Verónica Navarro Ramírez
  - Melania Ramírez Olmos
  - Alberto Martínez Carrasco

Contact with the biobank is through the website (<http://www.biobanco.imib.es>), corporate e-mail ([biobanco@imib.es](mailto:biobanco@imib.es)) and the telephone number is 868 88 50 84.

## LOCATION AND FACILITIES

The Biobank Central Core Facility is located in the LAIB building of the Health Sciences Campus and occupies laboratories 0.13, 0.14, 0.25 and -1.16. It has two laboratories of 40 m<sup>2</sup> each, a cryopreservation room of 80 m<sup>2</sup>, with restricted access for biobank staff and a coordinating room of 40 m<sup>2</sup>. It is equipped with the following equipment:

- › Cryopreservation equipment with temperature monitoring for the preservation of biological samples: two refrigerators (4°C), 11 freezers (8 of -80°C, one of -40°C and two of -20°C), three nitrogen tanks (liquid and vapor phase), portable containers and nitrogen vessels.
- › High vacuum transfer system for biological samples located in the operating room areas of the HCUVA.
- › Automatic nucleic acid extractors using several methods.
- › 2D tube readers and label printers.
- › UVVIS plate reader (Nanoquant).
- › Fluorimeter (Quantus).
- › Electrophoresis systems (by capillary and horizontal).

- › Specific equipment for sample processing: biological safety cabinet, cell counter, three centrifuges, PCR preparation cabinet and two thermal cyclers.

During 2019, the temperature registration probes were replaced, incorporating the maximum and minimum registry, recommended during the 2018 internal audit and which was resolved to implement the registry of some equipment for cryopreservation.

We participated in the 2019 call for acquisition of scientific and technical equipment, requesting automatic equipment for aliquotting liquid samples. The funding was not obtained.

## SERVICE PORTFOLIO

The activity of the biobank during 2019 has been structured based on the aforementioned key functions.

### **TECHNICAL, ETHICAL AND LEGAL ADVICE**

The IMIB Biobank offers advisory services and preparation of reports regarding the management of human biological samples or temperature records aimed to guaranteeing both traceability and storage conditions. During 2019, the biobank performed 28 services of this type for both internal and external groups.

#### ***IMIB groups:***

##### **Area 1**

- › Molecular Pathology and Pharmacogenetics (1s)
- › Molecular therapies and solid tumors biomarkers (1s)

##### **Area 2**

- › Clinical and experimental cardiology (5s)
- › Research in Pediatrics (3s)

##### **Area 3**

- › Gastrointestinal, endocrine and abdominal organ transplant surgery (8s)
- › Nutrition and food science (1s)

##### **Area 6**

- › Hematopoietic Transplant / Cell Therapy (5s)

#### ***External Groups***

- › Universidad Miguel Hernández of Elche (1 s).
- › Hematology and Hemotherapy Service of the HCUVA (1 s)

### **SAMPLE AND DATA MANAGEMENT**

The samples are processed following standardized procedures common to the RNBB

biobanks, guaranteeing the quality of the products obtained, storage under the cold chain optimal maintenance conditions (freezers connected to a surveillance and temperature monitoring system) and the traceability of the samples. Sample management is carried out in compliance with the ethical and legal requirements of the standards applicable to biomedical research using biological human samples.

As of December 31, 2019, the biobank IMIB manages a total of 145. During 2019, 15 new collections have been established, one of them belonging to the biobank and within the strategic plan of the National Network of biobanks (PROCURE), associated with 13 groups of the IMIB.

During 2019, a total of 18,106 samples from 10,362 donations have been processed. The biobank has a total of 238,819 available samples, corresponding to 44,183 donations.

The groups that participate in these collections are:

**IMIB Groups:**

**Area 1**

- › Clinical, Techological, Cellular and Molecular Bases in Gastrointestinal Medicine.
- › Molecular Pathology and Pharmacogenetics. A new one in 2019.
- › Molecular Therapies and Solid Tumors Biomarkers. Three new ones in 2019.

**Area 2**

- › Clinical and Experimental Cardiology. Two new ones in 2019 (CIBERCV Intramural Project).
- › Research in Pediatrics. A new collection in 2019
- › Venous Thromboembolism.
- › Medical Physiology.

**Area 3**

- › Gastrointestinal Surgery, Endocrine and Abdominal Organ Transplantation, four new ones in 2019.

**Area 5**

- › Research in Epidemiology and Public Health.

**Area 6**

- › Infectious pathology. One in 2019 (PIEM / 2017/0002)
- › Immunology and Immunotolerance in Transplants and Immunological Bases Diseases.
- › Hematopoietic Transplantation / Cell Therapy. A new collection in 2019.

**Area 7**

- › Reproductive Physiology and Assisted Reproduction.

**External groups:**

- › Instituto de Neurociencias. Universidad Miguel Hernández.
- › HCUVA: Servicios de UCI, Unidad de Corta Estancia, Neumología y Otorrinolaringología.
- › Hospital General Universitario Santa Lucía: Servicios de Hematología y Hemoterapia, Cardiología, Neumología, Alergología, Oculoplastia, Oncología, Nefrología y Reumatología.
- › Hospital Universitario Morales Meseguer: Servicio oncología y Anatomía patológica.
- › Departamento Farmacología. Universidad de Murcia). Una colección nueva en 2019.
- › Departamento CIENCIAS SOCIO-SANITARIAS. Universidad de Murcia. Una colección nueva en 2019.
- › Institute of Neurosciences. Miguel Hernández University.
- › HCUVA: ICU Services, Short Stay Unit, Pneumology and Otorhinolaryngology.
- › Santa Lucía University General Hospital: Hematology and Hemotherapy, Cardiology, Pneumology, Allergology, Oculoplasty, Oncology, Nephrology and Rheumatology Services.
- › Morales Meseguer University Hospital: Oncology and Pathology Department.
- › Pharmacology Department. University of Murcia). A new collection in 2019.
- › SOCIO-SANITARY SCIENCES Department. University of Murcia. A new collection in 2019.

**TRANSFER OF HUMAN BIOLOGICAL SAMPLES**

During 2019, the Central Core Facility assisted to 280 internal requests and eight assignments of samples and data (six of them to external projects) with the corresponding authorization from both the internal and the ethics committees (CEI and CCI) and signing of the material transfer agreement and associated budget.

These requests and assignments correspond to 42,150 aliquots sent (40,519 samples) during 2019 corresponding to 5,505 donations.

**IMIB Groups (Internal sample transfer):**

- › Hematology and Clinical and Experimental Medical Oncology.
- › Clinical and Experimental Cardiology.
- › Gastrointestinal Surgery, Endocrine and Transplantation of Abdominal Organs (ERC Consolidator Grant. Reference: 6145778).
- › Research in Epidemiology and Public Health.
- › Immunology and Immunotolerance in Transplants and Immunological Bases Diseases.
- › Research in Pediatrics.
- › Clinical, Technological, Cellular and Molecular Bases in Gastrointestinal Medicine.
- › Hematopoietic Transplantation / Cell Therapy. (Carlos III Health Institute. Reference: PI17 / 02164).
- › Nutrition and Bromatology.
- › Reproductive Physiology.



- › Clinical Microbiology and Tropical Medicine.
- › Molecular pathology and Pharmacogenetic.
- › Molecular Therapies and Solid Tumors Biomarkers.

**External groups:**

- › Two transfers to La Princesa Hospital (Community of Madrid. Reference: IND2017 / BMD-7875 and Carlos III Health Institute. Reference: FIS17 / 02244)
- › A transfer to the Institute of Biomedicine of Seville (Carlos III Health Institute, CIBERNED COLLABORATIVE PROJECTS. Reference: PI15 / 00957)
- › A loan from the Research Institute of the La Paz University Hospital (Carlos III Health Institute. Reference: PI14 / 01234)
- › A transfer to Castilla-La Mancha University (Ministry of Economy and Competitiveness. Reference: SAF2016-75768-R)
- ›

**SAFEKEEPING OF COLLECTIONS AND SAMPLE MANAGEMENT EXTERNAL TO THE BIOBANK**

During 2019, the Central Core Facility initiated four services of sample custody for two external research groups.

**IMIB groups:**

**Area 1**

- › Molecular therapies and biomarkers of solid tumors, one custody (TrialGEICAM / 990)

**Area 2**

- › Clinical and Experimental Cardiology, two custodies (EudraCT Number:2014-004512-11) and (Multicenter Spanish National Project. 01/01/2018-31/12/2020).

**External groups:**

- › Torrejón University Hospital
- › Universal Diagnostic (a private company, located in Seville and working internationally, that has a collaboration with the IMIB Biobank since 2017)

**SAMPLE PROCESSING AND MOLECULAR TECHNIQUES (EXTRACTION OF NUCLEIC ACIDS)**

During 2019, 10 sample processing services were conducted for 6 groups of the IMIB.

**IMIB Groups:**

**Area 1**

- › Hematology and Clinical and Experimental Medical Oncology (1s)

**Area 2**

- › Clinical and Experimental Cardiology (1S)
- › Medical Physiology (1S)

**Area3**

- › Nutrition and Bromatology (2S)

**Area 6**

- › Immunity, inflammation and cancer (2s)
- › Hematopoietic Transplantation / Cell Therapy (2s)

**PUBLICATIONS**

During 2019, 11 articles published by the IMIB and external groups thanked the Central Core Facility for transferring data and samples.

The Biobank, as an IMIB Central Core Facility, has participated in different social, scientific and clinical dissemination actions.

In the scientific field, the Central Core Facility has participated in the X National Congress of Biobanks, being part of the scientific and organizing committee and contributing with six publications in poster format. One of them won the prize for the best poster in the category of “Other themes”.

In addition, within the RNBB we participate in working groups in all the strategic lines marked for PT17 / 0015/0001, obtaining funding from the IMIB Biobank (PT17 / 0015/0038). We were also invited as speakers at the III CEI-IB Training Conference: New challenges in research and human biological samples.

We are part of the organizational structure of the RNBB as members of the Management Committee, the Ethical-Legal Advisory Committee, the Quality Commission and the Events Commission.

The IMIB biobank has also participated in training sessions organized by the RNBB:

- › I Advanced training day of the Application Management System
- › I Conference on communication training: RNBB communication plan and strategy. And corporate identity manual.
- › I Conference Document Management Training RNBB
- › I Symposium on the detection of scientific production derived from the use of samples through Google Scholar
- › I RNBB working days
- › ENAC information day on biobank accreditation

The biobank participates in activities related to teaching. The scientific coordinator participated as a panel member of a Doctoral Thesis of a European Program, entitled “Collection, Biobanking and Characterization of Human Tubal and Uterine Fluids for their future use in Assisted Reproductive Technologies” in which The IMIB Biobank is mentioned as a service Central Core Facility for the development of the project.

We have participated for three years in the “V Basic Course of Clinical Research: Standards of Good Clinical Practice”. On May 16-18, 2019, we participated in the II Symposium on Genetics of Dementia, invited as the Brain Bank, part of the IMIB Biobank. The symposium included within the framework of the IV Malaga Alzheimer Conference and organized by the Andalusian Institute of Neuroscience.

The IMIB Biobank participated in the Science and Technology Week 2019, that took place on November 8, 9 and 10 at the Malecón Botanical Garden, disseminating its activity and teaching people how it helps to achieve excellent biomedical research.

The biobank has participated, within the Collaboration Agreement signed by the IS-FPS CLAUDIO GALENO (COD. 30020376) and the FFIS, in the development of the Training in Work Centers module. Hosting two students from this center and providing 400 hours training. Also during the year 2019, the Biobank received two trainees from the IES “El Bohío”, as part of the teaching course “CLINICAL AND BIOMEDICAL LABORATORY” within the Training Plan in Work Centers.

Finally, for three years the Biobank has participated in a workshop, “Work Experience” with the Limonar International School. The biobank received during a week three students from this center.



IMIB Laboratory

# BIOINFORMATICS AND BIOMEDICAL COMPUTACIONAL BIOLOGY CENTRAL CORE FACILITY

## CONTACT

Director: Dr. Ángel Esteban  
Bioinformatics and Biomedical Computacional Biology Central Core Facility  
Murcian Institute of Biosanitary Research (IMIB)  
Health Science Campus, Edificio LAIB, Crta. Buenavista s/n, 2ª Planta,  
Lab 2.02  
30120 El Palmar (Murcia)  
Phone: +34 868885229, +34 868885239, +34 868885249  
Web: <http://www.bioinformatica.imib.es/>  
E-mail: [bioinformatica@imib.es](mailto:bioinformatica@imib.es)

## OVERVIEW

The main objective of the Central Core Facility is to offer services related to the biomedical informatics and bioinformatics in order to respond to the requirements of the IMIB research projects. To achieve this goal, we will use the most frequently used tools in the field of biomedicine to facilitate the dissemination of results.

## SERVICES

The services offered by the Central Core Facility are divided into:

### **Software solutions:**

- › **ELORA:** laboratory management software.
- › **BALOO:** mammalian housing management software.
- › **WANDA:** fish housing management software.
- › **SemanticCRF:** software for creating and managing case report forms in Web format.
- › **SECARE:** software for the exploitation of epidemiological databases.
- › **DIGEVAR:** enrichment, filtering and coverage studies of genomic massive sequencing experiments.
- › **KHEIRON:** software for the management of biomedical research.
- › **COLPORTAL:** Central Core Facility for combined analysis of clinical and omic data applied to a cohort of patients with colorectal cancer.
- › **PATHMIR:** Central Core Facility for functional analysis (both at clinical and molecular biology level) of MiRNAs.
- › **BIOPATHNET:** Central Core Facility for functional analysis (both at clinical and molecular biology level) of protein networks.
- › **FLORENCE:** Central Core Facility for measuring workloads in the healthcare field.
- › **CMBDQual:** Central Core Facility to establish and measure indicators based on CMBD data.

**Services:**

- › Analysis of omic data (genomic, proteomic, transcriptomic, metabolomic, etc.).
- › Analysis using machine learning techniques on biomedical data.
- › Integration of biomedical databases.
- › Standardization of biomedical data.

**MEMBERS**

Dr. Ángel Esteban Gil. Central Core Facility coordinator and PhD in Computer Science  
 Dr. M<sup>a</sup> Carmen Legaz García. PhD in Computer Science  
 M<sup>a</sup> Antonia Parreño González. Master in Computing  
 Fernando Pérez Sanz. Doctor in Bioinformatics

**EQUIPMENT**

- › Two HP DL360 G9s with a total of 48 threads and 512 GB of RAM.
- › NVIDIA Tesla P4 with 2400 nuclei GPU.
- › Two Sinology disks with redundant capacity of 50 TB.

**SERVICE PORTFOLIO**

**IMIB Groups:**

- › Hematology and Clinical-Experimental Medical Oncology.
  - Dr. Constantino Martínez and Dr. Rocío González-Conejero. DIGEVAR and PA-THMIR.
  - Dr. José Rivera and Dr. Marisa Lozano. DIGEVAR and SemanticCRF.
  - Dr. Javier Corral. Support for massive sequencing with Nanopore technology.
  - Dr. Francisca Ferrer. Analysis of microarrays expression.
  - Dr. Andrés Jerez. DIGEVAR for exome analysis.
- › Molecular Pathology and Pharmacogenetic.
  - Dr. Pablo Conesa. COLPORTAL and analysis of omics data.
- › Clinical and Experimental Cardiology.
  - Dr. Domingo Pascual. Semantic CRF (4 different cohorts).
  - Dr. Gonzalo de la Morena. SemanticCRF.
  - Dr. Juan Ramón Gimeno. DIGEVAR and analysis of biomedical data.
- › Research in Pediatrics.
  - Dr. Luis García-Marcos. SemanticCRF.
- › Gastrointestinal Surgery, Endocrine and Abdominal Organ Transplantation.
  - Dr. Alberto Baroja. Analysis using Machine Learning with biomedical data. Methylation analysis at different times.
  - Dr. M<sup>a</sup> Luisa Cayuela. Functional analysis of gene and / or protein.
- › Surgery Research in Healthcare.
  - Dr. Víctor Soria. CMBDQual for registration and measurement of surgical in-

- dicators.
- › Experimental Ophthalmology.
    - Dr. Marta Agudo. Analysis of RNA expression in several time series.
  - › Brain Regionalization and Development Genes.
    - Dr. Rut Valdor. RNA Seq analysis.
  - › Advanced Nursing Care.
    - Dr. Fuensanta Guillén. Launch of FLORENCE for Nursing Load Measurement.
  - › Immunology and Immunotolerance in Transplants and immune diseases.
    - Dr. Alfredo Minguela. Biostatistical analysis.
  - › Hematopoietic Transplant / Cell Therapy.
    - Dr. Miguel Blanquer. SemanticCRF for clinical trial. Design and adaptation of ELORA for quality control in Hematopoietic Transplantation.
  - › Immunity, Inflammation and Cancer.
    - Dr. Víctor Mulero. Microbiome analysis.
  - › Clinical and Translational Oncology.
    - Dr. José Luis Alonso. SemanticCRF.
  - › Reproductive Physiology and Assisted Reproduction.
    - Dr. Pilar Coy. ELORA for the collection of reproductive fluids and methylation analysis.

#### **IMIB Central Core Facilities:**

- › Biobank Central Core Facility: development and implementation of improvements in ELORA.
- › Animal Facility Central Core Facility: development and implementation of improvements in BALOO. Setting up WANDA.
- › Biobank Central Core Facility: development and implementation of improvements in ELORA.
- › Animal Facility Central Core Facility: Implementation and development of improvements BALOO. Setting up WANDA.
- › Pathology Central Core Facility: collaboration in a regional innovation project.
- › Genomics Central Core Facility: support in the design and analysis of several studies.
- › IMIB Central Core Facilities: implementation of the online service request system.

#### **External Services:**

- › Veterinary department, University of Murcia. Microbiome analysis.
- › General Directorate of Planning, Research, Pharmacy and Citizen Services. SemanticCRF (three cohorts).
- › CIBERCV. PMPCV.NET (Cardiovascular Precision Medicine Central Core Facility).
- › Institute of Biomedical Research of Salamanca. DIGEVAR for the analysis of samples with congenital platelet disorders.

## **ACTIVITY**

Below we list quantitative data from 2019 on the activity of our main software Central Core Facilities:

- › ELORA: 11,969 samples donations. Management of 56,382 input samples. 85,002 aliquots were stored.
- › BALOO: 1,976 new animals and managed 77 crossings.
- › SemanticCRF: 743 recruited patients and 2,880 completed questionnaires. During 2019 it was used in 19 different cohorts.
- › DIGEVAR: 637,824 new variants distributed in 5 research studies: congenital platelet disorders, leukemia, inherited heart disease, acute myocardial infarction in people under 40 years of age, and renal cancer.

Scientific publications:

- › 6 articles in indexed journals including COLPORTAL, a publication led by our Central Core Facility.
- › 6 papers presented in scientific conferences.
- › Participation as speakers in the IV Scientific Conference of the IMIB.

Other activities to highlight:

- › Participation in the excellence network obtained last year to Transbionet as part of the research team (Spanish Network of Translational Bioinformatics).
- › Achievement of the first competitive Project in innovation led by IMIB Central Core Facilities (in collaboration with the Pathology Central Core Facility) funded by the Seneca Foundation.
- › Adaptation of KHEIRÓN for the automatic generation of the indicators of the new ISCIII accreditation guide for research institutes. This adjustment was considered as one of the greatest strengths of our Institute.
- › Adaptation of SemanticCRF to include monitoring tasks to be used in Clinical Trials with Drugs or Medical Devices.
- › Adaptation of BALOO to work with fish, giving rise to a new software Central Core Facility (WANDA).
- › Attendance to scientific events related to the integration of clinical and omics data, and the analysis of structural variants.
- › Participation in one of the COST actions (The International Network for Translating Research on Perinatal Derivatives into Therapeutic Approaches CA17116)

# PROTEOMICS CENTRAL CORE FACILITY

## CONTACT

Director: Dr. Esteban Orenes  
Web: [www.proteomica.imib.es](http://www.proteomica.imib.es)  
Email: [esteban.orenes2@carm.es](mailto:esteban.orenes2@carm.es), [proteomica@imib.es](mailto:proteomica@imib.es)

## OVERVIEW

The Proteomics Central Core Facility of the IMIB is an infrastructure with the main scope of separation, quantification, identification and characterization of proteins in systems of biological and biomedical interest using two-dimensional electrophoresis techniques, multi-dimensional liquid chromatography and mass spectrometry.

## ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLES

Head of the Proteomics Unit: Dr. Esteban Orenes Piñero.

Dr. Esteban Orenes Piñero is in charge of protocol drafting, advising the researchers who require the services of the Central Core Facility and the maintenance and correct operation of all the equipment available in this unit. Likewise, he is responsible for all the research work carried out in the Unit.

## RUNNING OF THE FACILITY

From the Proteomics Central Core Facility we advise and design protocols together with the researchers that require our services. Therefore, it is recommended that researchers contact the Central Core Facility via email or visit the Central Core Facility's headquarters at LAIB Laboratory 0.15. Once the services, budget and execution time are defined, the Central Core Facility will carry out the work within the established time frame. The researcher will be able to know the status at all times, as well as make any modification or request additional services depending on their needs.

Once the work has been successfully completed, the services performed will be billed to the researcher.

## LOCATION AND FACILITIES

The Central Core Facility is located in the LAIB building (laboratory 0.15). The laboratory is equipped with a complete system for separating proteins using two-dimensional electrophoresis, as well as the necessary technology for 2D-DIGE (two-dimensional electrophoresis



with pre-labeling of samples with differential fluorophores) associated with a Typhoon 9410 scanner that allows the acquisition of images and identification of differences in expression in the analyzed samples. In addition, the Proteomics unit has a fully automated spot picker robot (Ettan Spot picker). Finally, for the identification and characterization of proteins, the Central Core Facility has a mass spectrometer (LCMS) coupled to an ion trap (LXQ). In this way, the Proteomics Central Core Facility has all the necessary instruments to separate, quantify, identify and characterize proteins of biomedical interest. In addition, the Proteomics Unit has an AKTA 10 purifier chromatography kit for the purification from micrograms to milligrams of all types of proteins, including antibodies and recombinant proteins. On the other hand, in the proteomics Central Core Facility, protein separation and purification is performed using gold nanoparticles, a novel protein purification method for subsequent identification.

## SERVICES PORTFOLIO

- › 1D electrophoresis (includes 2 1D gels; Coomassie or Silver staining and image acquisition): 8 x 7 cm gels (Mini-gels).
- › Two-Dimensional Electrophoresis (includes 2D gel; staining and image acquisition): Gels 17 x 19 cm. Coomassie stain, silver or DIGE (Cyanine Fluorochromes).
- › Western-Blotting (Transfer, Immunoblot, developing).
- › ELISAs both commercial and home-made.
- › Sample purification with gold nanoparticles.
- › Spot chopping and protein digestion with trypsin.
- › Protein identification by LC-MS / MS (Ion Trap) by different gradients.

## ACTIVITIES 2019

### **Collaborations with IMIB groups:**

- › Group of Molecular Therapies and Biomarkers of Solid Tumors: 2 projects.
- › Medical Oncology Group, Virgen de la Arrixaca University Hospital: 2 Projects.
- › Nutrition Group, University of Murcia: 1 Project.
- › Group of Brain Regionalization and Development Genes: 1 Project.
- › Clinical and Experimental Cardiology Group: 1 Project.
- › Department of Legal Medicine and Toxicology, University of Murcia: 2 Projects.
- › Department of Pharmacology, University of Murcia: 1 Project.

### **Collaborations with external groups:**

- › Project 2017-7-5-HCUVA. Cátedra Poncemar y UMU.
- › Project SAF2016-77241-R del MINECO.

# TISSUE CULTURE CENTRAL CORE FACILITY

## CONTACT

Email: [acti.sct@um.es](mailto:acti.sct@um.es)

Web: <https://www.um.es/web/acti/contenido/servicios/cultivo-tejidos>

## OVERVIEW

The Tissue Culture Service (TCS) belongs to the Scientific and Technical Research Area of the University of Murcia (ACTI) and it is part of the IMIB-UMU Central Core Facilities. Since it was created in the 80s, the TCS aims to facilitate the development and maintainance of technologies related to cell culture required by researchers.

The Central Core Facility also performs an important teaching activity organizing courses and seminars on the techniques offered, collaborating in courses and internships organized by other Central Core Facilities and mentoring students in training.

The Tissue Culture Central Core Facility has facilities on the Campus of Espinardo (SACE building) and Biosciences (LAIB building). The Central Core Facility offers a complete infrastructure for cell and tissue culture (Biological Containment Level 2 laboratories (NCB2), biological and chemical safety booths, CO2 incubators, etc.) as well as cryopreservation services, flow cytometry analysis, cell separation (magnetic separation and sorting) and a variety of techniques related to cell and tissue culture: light microscopy (phase contrast, bright field, dark field and fluorescence), digital photomicrograph, spectrophotometry, absorbance, fluorescence and luminescence measurements, circadian rhythm measurement, multiplex assays, etc. It is important to highlight the equipment of flow cytometry, such as one 5-laser flow cytometer with 18 fluorescences and a cell separator (sorter), unique in the Region of Murcia.

The instrumental equipment will be completed soon with the acquisition of a metabolic analysis Central Core Facility in living cells, obtained in the FEDER 2019 call. Thanks to the support of IMIB's researchers, University of Murcia and other public research centers of Region (IMIDA and CEBAS).

## ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLE

The Tissue Culture Service depends structurally of the ACTI of the University of Murcia and during 2019 had the following members:

- › **Responsible (Head of service):** Antonia Bernabeu Esclapez ([abe@um.es](mailto:abe@um.es))
- › **Doctors:** Dr. Pilar González Párraga ([gparraga@um.es](mailto:gparraga@um.es)), Dr. Silvia García Castillo ([sgc@um.es](mailto:sgc@um.es)) and María Jesús Manzano Cascales ([mjesus.manzano@um.es](mailto:mjesus.manzano@um.es))
- › **Senior technician MINECO:** Dr. Ana Pagán Bernabeu ([anapagan@um.es](mailto:anapagan@um.es))

- › **Specialist technician from *Fondo de Garantía Juvenil***: Verónica Navarro Ramírez (veronica.navarro@um.es)

The goal of the Tissue Culture Central Core Facility is to provide research groups with the development and maintenance of technologies related to cell culture required to carry out their research.

## RUNNING OF THE FACILITY

Investigators can access the services offered by the TCS through the website of the IMIB Central Core Facilities:

[http://www.imib.es/portal/plataformas/plataformas\\_imib.jsf](http://www.imib.es/portal/plataformas/plataformas_imib.jsf) or accessing the website of the TCS: <https://www.um.es/web/acti/contenido/servicios/cultivo-tejidos>

The application for services will be made through the application G-SAI linked to the website of the Central Core Facility.

## LOCATION AND FACILITIES

The Tissue Culture Service is located in the LAIB building of the Biosciences campus (laboratories B1.0.07, 0.08, 0.09, 0.10, 0.28 y 0.29) and the SACE building in the Campus of Espinardo (building nº 21: B1.1.007 a la B1.1.016).

The facilities of the Tissue Culture Service of the LAIB and SACE buildings meet the requirements of Biological Containment Laboratories 2 (laboratories NCB2), which implies not only the characteristics of the facilities but also a code of practice and procedures that those who work in these laboratories must commit to comply with.

The complete list and the characteristics of the equipment, and the location are described on the website: <https://www.um.es/web/acti/contenido/servicios/cultivo-tejidos/instalaciones-y-equipamiento#instrumentacion>

## SERVICE PORTFOLIO

The Tissue Culture Service offers the following services:

- › Complete infrastructure to work with cells and tissues of animal origin that require a containment up to level 2 (laboratories NCB2, biological safety stalls, CO2 incubators, inverted microscopes, etc).
- › Technical advice for users.
- › Training and supervision to learn the available techniques.
- › Maintenance of equipment and facilities.
- › Preparation of material, culture media and reagents.
- › Heat sterilization.
- › Mycoplasma test.
- › Cellbank for the university community and the IMIB (stock maintenance).

- › Cryopreservation of samples (management software with traceability).
- › Microscopy of bright field, dark field, phase contrast and epi-illumination.
- › Digital microphotography and time lapse.
- › Analysis by flow cytometry.
- › Separation of cell populations (Sorting and magnetic spheres).
- › Analysis by fluorimetry, spectrophotometry and luminescence measurements.
- › Luminometry for circadian biology.
- › Multiplex assays (immunoassays, System MAGPIX®).
- › Particle counts (1-120 microns).
- › Conventional centrifugation, cytocentrifugation and high speed.
- › Supply of dry ice and liquid nitrogen.
- › Performing tests (check availability with the Head of Service).
- › Other services: Mentorship of students of Formación Profesional in companies, Mentoring internships of students, etc. (check availability with the Head of Service).

## ACTIVITIES 2019

During 2019 the SCT has provided service for a total of 134 different users and at least 82 research projects, Doctoral Theses and Undergraduate and Master's dissertations, most of it developed within bioscience research.

The services offered by the unit includes analysis with technical support using the different equipment, technical advice to users in the design of experiments and data analysis, preparation of media and reagents, testing, etc.

Some of the users of the Central Core Facility are researchers from the IMIB, UMU, *Centro de Edafología y Biología Aplicada del Sureste* (CEBAS), *Instituto Murciano de Investigación y Desarrollo Agrario y Alimentario* (IMIDA) and private businesses.

During 2019, the Tissue Culture Central Core Facility has participated in several educational and training activities. Specific courses and seminars on the available techniques have been organized (cell cultures and flow cytometry) and the staff has taught in the *Máster de la Escuela Internacional de Doctorado* (EIDUM) and training courses of the *Plan de Formación Corporativa* of the UMU, collaborating also in the practical classes of the degrees in Biochemistry, Biology, Environmental Sciences, Biotechnology and Veterinary Medicine, as well as in master's degree.

Other training activities are the mentoring of *Formación Profesional* students in work placements (ciclo formativo de grado superior en Anatomía Patológica y Citodiagnóstico), and the visits to Training Centers, as part of the teaching program.

In addition to the activities already mentioned, the Tissue Culture Central Core Facility has actively participated in the annual Science and Technology Week and in the IMIB IV Conference, contributing by sending two communications.

# ANIMAL EXPERIMENTATION CENTRAL CORE FACILITY

## CONTACT

Email: [acti.sea@um.es](mailto:acti.sea@um.es)

Web: <https://www.um.es/web/acti/contenido/servicios/experimentacion-anim>

## OVERVIEW

The Animal Experimentation Service (SEA), is part of the Scientific and Technical Research Area, it is part of the IMIB Central Core Facilities from the UMU.

It is located on the Campus of Espinardo, in the CEIB (Bioscience campus) and in the Veterinary Teaching Farm, working since 1983. All the facilities of the Central Core Facility are included in the registration as a User Center: N° REGA ES300305440012.

The SEA's role is to support scientific research and teaching, with the goal of replacing and reducing the use of experimental animals in procedures, and to refine the breeding, housing, care, and use of animals in such procedures.

The activity is focused on the supply, breeding and maintenance of experimental animals, under different conditions. There are several areas available according to the needs of the project (SPF Zone, GMO type 1 and conventional Zone), offering technical support to carry out procedures and advice on experimental design, always ensuring compliance with the 53/2013 Royal Decree.

In 2019, the unit have developed biosafety and adaptation of spaces for studies of the aquatic environment and this will allow the development in the unit of new lines of research, complying with all current regulations.

It is important to mention that the offer of SEA services will also be significantly increased in the coming months, thanks to the co-financing obtained with FEDER funds. These funds are aimed at improving fish experimentation and, on the other hand, at acquiring a MicroCT equipment. This new equipment together with an ultrasound system and a SPECT-CT system (unique in the región and already available on the Central Core Facility) will complete the equipment available to researchers for obtaining more accurate preclinical and clinical images, thus improving their experimental results towards research excellence.

## ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLE

The SEA depends on the ACTI-UMU.

The following researchers were part of the unit throughout 2019:

**Responsible (Head of service):** Carmen Lagares Martínez (clm@um.es)

**Veterinary:** Dr. Nuria García Carrillo (ngc2@um.es)

**Technical specialists:** Antonio Cano Gómez (agc3@um.es), Dr. Enrique Bautista Muñoz (ebm@um.es), Manuel Nortes Pérez (mnp2@um.es), Yolanda Martínez Verdú (ymv@um.es), Francisco José Zapata Nicolás (franzapa@um.es), Josefa Martínez Rabadán (jmr2@um.es), Isabel M<sup>a</sup> Navas Ruiz (isabelmaria.navas@um.es), Dr. Manuel J. Saura Pujante (mjsaura@um.es), José González Bautista (jose.gonzalez1@um.es) y Silvia Fernández Pérez (sfp1@um.es)

**MINECO (Higher University degree):** Dr. Isabel M<sup>a</sup> Pujante Rodríguez (isabelm.pujante@um.es)

**MINECO (Medium level qualification):** Antonio Tapia Moragón (antonio.tapia@um.es)

The SEA complies with current legislation, and designating to the members the roles of Animal Welfare Manager, Designated Veterinarian and Supervisor of the Nuclear Medicine Facility.

The main objective of the unit is to provide the facilities and personnel required to work in research with laboratory animals.

## RUNNING OF THE FACILITY

Researchers can access the services offered by the Animal Experimentation Central Core Facility through the website of the IMIB Central Core Facilities: [http://www.imib.es/portal/plataformas/plataformas\\_imib.jsf](http://www.imib.es/portal/plataformas/plataformas_imib.jsf) or accessing the unit's website <https://www.um.es/web/acti/contenido/servicios/experimentacion-animal>

The request for services can be made through the G-SAI application linked to the Central Core Facility's website.

## LOCATION AND FACILITIES

The SEA is physically located on the Campus of Espinardo, Biosciences Campus and the Veterinary Teaching Farm.

In the Biosciences Campus, we can find the CEIB building organized into several functional areas: rodent breeding and maintenance area (under different biosecurity conditions), an area for carrying out experimental procedures, rooms for handling radioactive substances, rooms for chronobiology of rodents and fish, room for behavioral studies, experimental operating room and administrative area.

In the same facilities, the unit has a Bimodal equipment for Preclinical use in Nuclear Medicine, SPECT-CT, union of a gamma camera SPECT (Single Photon Emission Computed Tomography) with a CT (Computed Tomography) and a special Ultramicrosonography equipment

for rodents and with high frequency transducers (20-70 MHz) and photoacoustic system to obtain anatomical, functional and molecular high resolution images.

At the Espinardo Campus, the SEA has several areas: one for breeding and maintenance of rodents and lagomorphs, a kennel area and an area for research into the aquatic environment. Several building Works are taking place in the aquatic area to adapt the laboratories for housing and experimentation with aquatic animals and plants. These facilities will centralize the use of aquatic animals / plants in a single building, providing users with an area uniquely and exclusively adapted to their needs, resulting in a research of excellence.

In addition, the facilities of the SEA in Espinardo have five laboratories for basic handling of animals (product administration, sampling, weighing, etc.) and several operating rooms. In the Veterinary Teaching Farm, the unit has spaces where the facilities for non-human primates and dogs are located.

Complete information on the unit's facilities and equipment is available at the following link: <https://www.um.es/web/acti/contenido/servicios/animales-laboratorio/instalacion-e-instrumentacion>

## SERVICE PORTFOLIO

Some of services offered by the Central Core Facility are:

- › Hematological and biochemical analysis in urine and blood samples.
- › Animals for research (rodents, lagomorphs, dogs and monkeys).
- › Assist researchers to obtain the authorization from the CARM, this includes the evaluation of the Ethical Committee for Animal Experimentation (Comité Ético de Experimentación Animal CEEA) of the UMU.
- › Technical personnel for laboratory support.
- › Support in diagnostic imaging techniques.
- › Advice in welfare and maintenance of animals and the design of experiments.
- › Advice on everything related to Ethics and Legislation in Animal Experimentation according to RD 53/2013.
- › Autoclave sterilization and bagged of cages and buckets and feed crushing.
- › Maintenance and breeding of animals for research (rodents, lagomorphs, monkeys, dogs, toads and fish).
- › Euthanasia and incineration of organic remains of experimental animals.
- › Management of animal orders to commercial providers.
- › Material for blood tests and surgical material for animal operations.
- › Use and orders of drugs.
- › Use of laboratories and use of operating rooms.
- › Use of the SPECT-CT and the ultrasound scanner.
- › Use of metabolic cages.

## ACTIVITIES 2019

During 2019, the SEA has supported more than 45 research groups from the UMU, IMIB, other public institutions and private businesses.

Our User Center, according to national and EU regulations, has communicated through the HAMELIN program (computer application of the Ministerio) that procedures have been carried out on 7,775 animals for the development of 92 projects, a significant percentage of which are led by an IMIB researcher.

Also, the Central Core Facility has participated in the organization and teaching of three courses on animal experimentation, it has contributed with a communication in the IV IMIB Conference and has held a large number of visits for undergraduate and masters students. In addition, the staff of the unit are advisors in the Comité de Bioseguridad en Experimentación (CBE) and the CEEA of the UMU, a qualified organization for the evaluation of projects with animal experimentation.



# SCIENTIFIC INSTRUMENTATION CENTRAL CORE FACILITY

## CONTACT

Email: [acti.suic@um.es](mailto:acti.suic@um.es)

Web: <https://www.um.es/web/acti/contenido/servicios/instrumentacion-cientifica>

## OVERVIEW

The scientific instrumentation Service (SUIC), it is part of the Scientific and Technical Research Area and of the IMIB/UMU partforms.

It started the activity in the 80s and from the beginning; the aim was to support the entire research community. Now, we continue to support research and we have extended our offer to public or private organizations that request it, being the IMIB research groups one of our biggest users.

Currently, the SUIC has available for the IMIB to use 15 chemical analysis laboratories, where you can find most of the instrumentation of the UMU (26 in our facilities), managed by a total of ten people, four of them doctors. Some of our most relevant instruments are our single-crystal X-ray diffraction equipment, unique in the Region, and the mass spectrometry and nuclear magnetic resonance equipment. These are the most demanded by IMIB groups, since they allow structural elucidation of new chemical compounds that could later be used as anti-tumor agents, photosensitizers in photodynamic therapies in cancer-related research or in studies of new drugs.

During 2019, the SUIC Central Core Facility has obtained funding from FEDER funds for the renovation of the consoles of the 400 MHz nuclear magnetic resonance spectrometers, which will allow us to obtain better quality data and better control of the temperature of the experiments, improving the results in studies of interactions of chemical compounds with biomolecules or in compound hydrolysis studies.

## ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLE

Members of the unit throughout 2019:

**Responsible:** José Rodríguez Martínez (**Head of Unit**, [perete@um.es](mailto:perete@um.es)) and Dr. Delia Bautista Ce-rezo (**Head of Unit**, [dbc@um.es](mailto:dbc@um.es)).

**Faculty:** Dr. Ana M<sup>a</sup> de Godos de Francisco ([degodos@um.es](mailto:degodos@um.es)), Dr. Raúl A. Orenes Martínez ([rao-renes@um.es](mailto:rao-renes@um.es)) and M<sup>a</sup> José Gabaldón Martínez ([mjgm@um.es](mailto:mjgm@um.es)).

**Specialist technicians:** Diego Martínez Pérez ([dmp@um.es](mailto:dmp@um.es)), Isabel Buendía Hernández ([ibh@um.es](mailto:ibh@um.es)), M<sup>a</sup> Dolores Pardo Sánchez ([mdps@um.es](mailto:mdps@um.es)), M<sup>a</sup> Dolores Hernández Córdoba ([mdhc@um.es](mailto:mdhc@um.es)) and Dr. María del Mar Ortín Avilés ([marortin@um.es](mailto:marortin@um.es)).

The main role of SUIC is to offer the UMU scientific community and other research centers, public or private, the facilities, **equipment and specialized personnel in the field of instrumental chemical analysis.**

## RUNNING OF THE FACILITY

Researchers can access the services offered by the scientific instrumentation Central Core Facility through the website of the IMIB Central Core Facilities [http://www.imib.es/portal/plataformas/plataformas\\_imib.jsf](http://www.imib.es/portal/plataformas/plataformas_imib.jsf) or accessing the unit's website <https://www.um.es/web/acti/contenido/servicios/instrumentacion-cientifica>.

The request for services can be made through the G-SAI application linked to the Central Core Facility's website.

## LOCATION AND FACILITIES

The SUIC is located on the ground floor, in the SACE building of the Espinardo Campus at the UMU. The SUIC currently has 15 laboratories with more than 600 m<sup>2</sup> distributed in five areas: laboratories for nuclear magnetic resonance, mass spectrometry, elemental analysis and thermal methods, single crystal X-ray diffraction and chromatography laboratory

The complete description of the unit's equipment can be found on the website: [https://www.um.es/web/acti/contenido/servicios/instrumentacion-cientifica/instalaciones\\_equipamiento](https://www.um.es/web/acti/contenido/servicios/instrumentacion-cientifica/instalaciones_equipamiento).

## SERVICE PORTFOLIO

Some of the services offered at the Central Core Facility are:

- › Advice on chemical analysis techniques and specialized personnel in different techniques.
- › Advice on result interpretation of the X-ray diffraction technique, together with the study of molecular interactions.
- › Advice and determination of metallic and non-metallic elements, anions and cations for:
  - The study of the presence and / or absence of metals in studies of accumulation in cells, the study of water quality, food products or the study of the quality and properties of soils, mud and sludge.
  - Determination of: % carbon, % hydrogen, % nitrogen and % sulfur in new synthesis compounds, in all types of soils and materials.
  - Counseling and conducting experiments (one-dimensional and two-dimensional), using nuclear magnetic resonance to study the structural elucidation of organic, inorganic chemical compounds, proteins, polymers, etc. under conditions of variable temperatures, making possible environmental hydrolysis studies, interactions of a compound with biomolecules, etc.
  - Determination of drugs, medicines, metabolites, vitamins, nutrients and

other compounds in biological fluids, food, water and the environment by gas chromatography, liquid chromatography and mass spectrometry.  
· Lyophilization of food, drugs, biological fluids, etc.

## ACTIVITIES 2019

In 2019, the SUIC Central Core Facility has carried out more than 15,000 analysis of different samples, with more than 7,000 of mass spectrometry, 2,500 of chromatography, 70 structural determinations of new compounds using single-crystal X-ray diffraction and nearly 4,000 hours of work on nuclear magnetic resonance equipment.

During 2019, several educational activities have been organized to train our students and researchers in the use, application and interpretation of results of the available equipment in the service. Some of the most relevant courses were the “IV Edition of the Doctoral Course of Introduction to Scientific Instrumentation (Chromatography and Mass Spectrometry)” and the “III Edition of the Doctoral Course of Scientific Instrumentation (Nuclear Magnetic Resonance, X-ray Diffraction, Thermal Analysis and Elemental Analysis)”.

SUIC staff has also collaborated in multiple internships in different doctoral courses, master’s degrees, and degrees in experimental sciences and biosciences.

Other activities of the Central Core Facility were coordination of visits with more than 500 visitors from different educational centers, scientific camps, UMU Senior Classroom, companies and public institutions in the region. In addition, the unit has actively participated in the annual edition of Science and Technology Week.

The SUIC has provided service to 40 UMU research groups, 5 public institutions and 8 private businesses. SUIC has served 11 IMIB research groups and has participated at IV IMIB Conference with two communications, showing the commitment and integration in the activity of the IMIB.

# MICROSCOPY

## CENTRAL CORE FACILITY

### CONTACT

Email: [acti.sum@um.es](mailto:acti.sum@um.es)

Web: <https://www.um.es/web/acti/contenido/servicios/microscopia>

### OVERVIEW

The Microscopy Service (SUM) began its activity in 1982 at the UMU School of Medicine. Today, it is a Central Core Facility of the IMIB part of the UMU Scientific and Technical Research Area. The unit can be found in two different locations: in the SACE building of the UMU and LAIB building of the Biosciences campus.

The Microscopy Service offers to IMIB research groups a set of services related to the use of transmission, scanning, field emission electron microscopes and high-performance optical microscopy, including confocal microscopy.

The equipment owned by SUM have the most advanced techniques in the Region of Murcia and they are used by several national universities, research institutes and different private companies.

During this year, the SP8 confocal spectral scanning microscope has been updated, and this microscope allows super-resolution through deconvolution, and the creation and navigation in mosaic or stitching. This equipment is specialized in working with living cells, since it has an incubation chamber to control physiological conditions and a microfluidic system was purchased.

In addition, the SUM has obtained FEDER funds for the acquisition of two new high-tech equipment: A confocal spectral scanning laser microscope with monitored stage, white laser and module to measure FRET-FLIM and a Widefield microscope with TIRF and super-resolution. These two FEDER awards obtained in 2019, will undoubtedly be very useful for many research groups of the IMIB, and they put the Microscopy Service of the ACTI in the national and international map of research in nanoscopy techniques.

### ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLE

The Microscopy Service depends structurally on the ACTI of the UMU and during 2019 has had the following staff:

**Responsible (Head of Service)** : María García García ([magaga@um.es](mailto:magaga@um.es))

**Faculty**: Dr. Manuela Bernal Albarracín ([mba@um.es](mailto:mba@um.es)) and Francisco Asensio Vidal ([fav@um.es](mailto:fav@um.es))

**Specialist Technicians**: José Joaquín Clares Ruiz ([josejoaquin.clares@um.es](mailto:josejoaquin.clares@um.es)), Dr. M<sup>a</sup> Teresa Coronado Parra ([mtcp2@um.es](mailto:mtcp2@um.es)), María Victoria Gómez Serrano ([mvs@um.es](mailto:mvs@um.es)) and Laura Guzmán

Laorden (lg@um.es)

Some of the Microscopy Service duties are processing of samples, microtomy and observation in light microscopy, confocal laser, scanning and transmission electron microscopy and other related techniques.

## RUNNING OF THE CENTRAL CORE FACILITY

Investigators can access the services offered by the SUM through the website of the IMIB Central Core Facilities: [http://www.imib.es/portal/plataformas/plataformas\\_imib.jsf](http://www.imib.es/portal/plataformas/plataformas_imib.jsf) or accessing the website of the SUM: <https://www.um.es/web/acti/contenido/servicios/microscopia>.

The application for services can be made through the application G-SAI linked to the website of the Central Core Facility.

## LOCATION AND FACILITIES

The SUM has two different locations: One in the SACE building at the Espinardo Campus and other one in the LAIB building at the Biosciences Campus.

The complete information on the equipment can be viewed at the following address: <https://www.um.es/web/acti/contenido/servicios/microscopia/instalaciones-e-instrumentacion>

## SERVICE PORTFOLIO

The Microscopy Service provides scientific advice to researchers in light microscopy, transmission electron, scanning, and field emission techniques, as well as confocal microscopy. This advice covers from the planning of the experiments and the preparation of the samples, to the visualization in the required equipment.

Some of the services that can be performed in the Microscopy Service, are the preparation of samples for the different techniques:

- a. Optical microscopy:
  - › Fixing and inclusion in paraffin and methacrylate resins.
  - › Inclusion of hard samples (bones, teeth, etc).
  - › Preparation of samples previously frozen to cut.
- b. Transmission electron microscopy:
  - › Fixing and inclusion in resins (epon, spurr, LR White).
  - › High pressure cryofixation.
  - › Cryosubstitution (fixation and inclusion at low temperature)
- c. Scanning electron microscopy:
  - › Inclusion of wet samples (fixation, dehydration, critical point and coating with gold and / or carbon).
  - › Coating of hard samples with carbon, gold, platinum, etc.
  - › Preparation of polished samples for surface studie.

d. Microtomy:

- › Obtaining fine sections for light microscopy
- › Obtaining semi-fine and ultra-fine sections in resins and cryoultramicrotomy for study with transmission electron microscopy.
- › Obtaining cuts by freezing with the cryostat microtome.
- › Obtaining hard sections without decalcifying with a diamond saw.

e. Observation and analysis:

- › Study, observation and analysis of samples in light microscopy, confocal microscopy and transmission and scanning electron microscopy.
- › Observation of semi-hydrated samples with field emission electron microscopy.

## ACTIVITIES 2019

In 2019 the Microscopy Service has had a very significant demand for services. It has processed 294 inclusions for transmission electron microscopy (TEM), 701 ultrafine and 366 semi-fine cuts for a total of 16 different research groups. In addition, 429 inclusions and coatings have been made with metals for scanning electron microscopy (SEM) from a total of 20 research groups, both from the UMU and to users of research centers and private companies. In addition, it has processed 234 samples for light microscopy (paraffin, methacrylate, among others) and 689 preparations, including the sections of hard samples.

The use of the equipment of the Microscopy Service during 2019 has been very intense: 340 hours of transmission electron microscopy, 355 hours of scanning electron microscopy, 147 hours in widefield and 1638 hours in confocal microscopy.

The staff of the unit is in continuous training taking international and national courses. The personnel from the Central Core Facility has participated in several teaching activities such as the postgraduate course at the University of Murcia “Instrumental Research Techniques in Experimental and Biomedical Sciences” and the “International Plastination Course” organized by the Veterinary Faculty of the UMU. The SUM Central Core Facility has also taught practical sessions on the Instrumental Techniques course for the 1st year of the Degree in Biotechnology of the UMU and the Master of Forensic Sciences of the UMU and has contributed with two communications to the IV Conference of the IMIB.

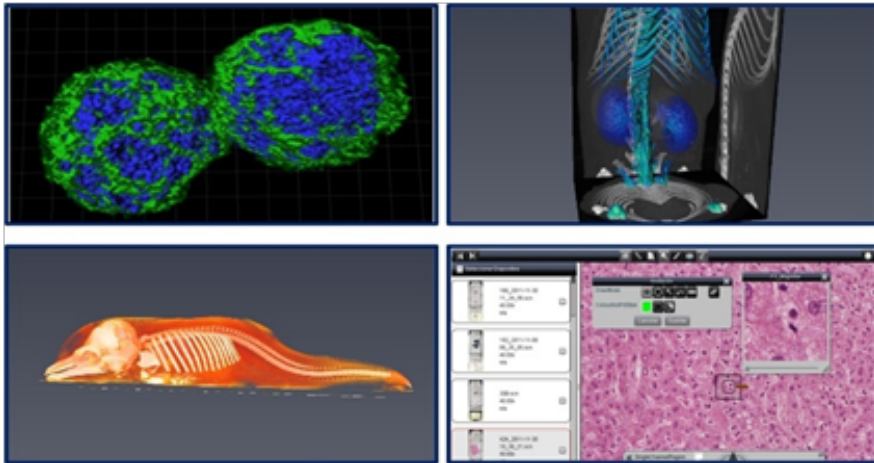
The SUM has carried out numerous communication activities, such as the annual edition of Science and Technology Week. In addition, has coordinated many visits from educational centers and companies.

# IMAGE ANALYSIS CENTRAL CORE FACILITY

## CONTACT

Email: [acti.sai@um.es](mailto:acti.sai@um.es)

Web: <https://www.um.es/web/acti/contenido/servicios/analisis-imagen>



## OVERVIEW

The Image Analysis Unit (SAI), is part of the Scientific and Technical Research Area (ACTI), and the IMIB Central Core Facilities provided by the UMU.

The Central Core Facility is located in the Espinardo Campus (SACE Building) and the Biosciences Campus (LAIB Building) and it has been providing services since 1992, to university groups and to other public and private institutions.

The main activity is to provide technical and scientific advice for the development of methods of acquisition and quantification of images. It is also able to obtain three-dimensional models, which are very useful in scientific and technical research, and also to ensure quality control and biomedical diagnosis.

The Central Core Facility provides a very broad service including study of samples from different sources, light and electronmicroscopy, 3D microscopy, electrophoresis gels, screens sensitive to radioactive signals, biomedical images of micro CT, PET, SPECT-CT, NMR and ultrasounds.

The unit has a double beam tomography microscope, unique in the Region, to obtain three-dimensional models of subcellular architecture, as well as powerful programs that allow advanced 2D-5D bio-imaging workflows in different research areas such as structural and cellular biology, neuroscience, preclinical imaging, and bioengineering.

During 2019, the Central Core Facility have acquired and set up a new membrane and gel development kit (LAIB laboratory) and a spectrofluorimeter (SACE laboratory). Updates to licenses for Amira preclinical study software and Imaris software have also been purchased and tuned with the Track Lineage module, which allows 2D / 3D motion tracking, automatically creating editable lineage trees, and calculating the duration of the cell cycle and time elapsed since the first division.

## ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLES

In terms of administrative organization, the Image Analysis Section depends of the Scientific and Technical Area of the UMU.

Members of the Central Core Facility in 2019 were:

**Responsible:** Dr. María Inmaculada García García (mariagarcia@um.es)

**Specialist Technician:** José María Fernández Seguí (jmfsegui@um.es)

The SAI offers the preparation of samples for image analysis, digital image improvement quantitative data acquisition (morphometric and densitometric) and three-dimensional reconstructions, which are very useful in scientific and technical research, quality control and biomedical diagnosis. Image analysis includes: macroscopic samples, light and electron microscopy, electrophoresis gels, blots, films, XRays or screens sensitive to radioactive signals.

Furthermore, the Central Core Facility provides design, scanner, color printing and poster printing tools for presentation of results for scientific and educational purposes.

## RUNNING OF THE FACILITY

Researchers can access the services offered by the SAI Central Core Facility through the IMIB Central Core Facilities website [http://www.imib.es/portal/plataformas/plataformas\\_imib.jsf](http://www.imib.es/portal/plataformas/plataformas_imib.jsf) or through the website <https://www.um.es/web/acti/contenido/servicios/microscopia>.

The request for services shall be made through the G-SAI application linked to the Central Core Facility's website.

## LOCATION AND FACILITIES

The SAI is located in the Espinardo Campus (SACE Building) and the Health Sciences Campus (LAIB Building).



The full description of the equipment available can be found at: <https://www.um.es/web/acti/contenido/servicios/analisis-imagen/instalaciones>

## SERVICE PORTFOLIO

We highlight the following services:

- › Counselling for the design of experiments.
- › Morphometric and densitometric analysis of macroscopic, microscopic samples, XRays, electrophoresis gels, blots, films, screens sensitive to radioactivity, tissue culture, arrays, etc. Stereological analysis.
- › Anatomical and functional analysis of biomedical images (ultrasound, SPECT, CT, NMR), colocalization and TrackLineage studies.
- › Macro programming for automatic execution of analysis.
- › 3D electron microscopy.
- › Preparation of 3D models compatible with printing. Confocal microscopy images, SEM / FIB microscope, SPECT, CT, NMR.
- › Development and quantification of gels and nucleic acid membranes, proteins and radiosensitive membranes. Proteomics studies.
- › Spectrofluorimetry studies: Obtaining excitation and emissionspectra of fluorescence and phosphorescence and 3D spectrum.
- › Scanning of microscopic samples to obtain virtual slides (maximum 400X). Bright field or fluorescence. Management of images in the Digital Image Hub (DIH) package and Remote Teaching Tool with virtual slides, with Digital Slide Box (DSB).
- › Preparation of samples for image analysis (suspensions and paraffin cuts and staining for light microscopy).
- › Modification and Image improvement.
- › Image digitalization.
- › Color printing of A4, A3 documents and posters on photographic paper and canvas

## ACTIVITIES 2019

During 2019, the Image Analysis Central Core Facility has experienced and intense activity as can be appreciated in the summary data: 31 morphometric and densitometric analysis, 7 studies of quantification and analysis of tomographic images, 3 projects of microscopy of double beam and a spectrofluorimetry study. In addition, 222 western blots and 18 radiosensitive membranes were developed, 745 slides were scanned and 35 virtual accounts were managed, 20 of which were aimed at online teaching of students mainly from degrees in biosciences.

The unit has actively participated in science communication activities, hosting visits from teaching centers in the Region of Murcia and also participating in the Science and Technology Week. Furthermore, due to their extensive training and specialization, the Central Core Facility's staff has been required to teach in several master's degrees, postgraduate courses and seminars. We highlight the following: the "Courseon Animal Cell Culture: Basic Concepts and Applied Techniques", the "Master in Biology and Technology of Mammalian Reproduction",

the “Master in Molecular Biology and Biotechnology” , the “Doctorate Course: Instrumental Research Techniques in Experimental and Biomedical Sciences”, the “XVII Plastination Workshop”, the “Animal Experimentation Course” and the “Pre-Congress Course of the XX Congress of the Spanish Society of Histology and Engineering Tissue (SEHIT2019) ”. In the IMIB Conference of this edition, the SAI has contributed by sending one communication.

# STATISTICAL SUPPORT CENTRAL CORE FACILITY

## CONTACT

Email: [acti.sae@um.es](mailto:acti.sae@um.es)

Web: <https://www.um.es/web/acti/contenido/servicios/apoyo-estadistico>

## OVERVIEW

The Statistical Support Section (SAE) is part of the Scientific and Technical Research Area, and part of the IMIB Central Core Facilities provided by the UMU and is located in the SACE building on the Espinardo Campus and it has been running since 1998.

The Central Core Facility activity focuses on the development and application of techniques within the field of Statistics, advice in research, methodology, hypothesis planning and design of experiments, statistical analysis and interpretation of the results obtained. It uses advanced and innovative techniques and in particular the powerful R statistical software.

It is a transversal service, providing support to a wide variety of research fields and applying different techniques for analyzing hypothesis tests, designing questionnaires, analyzing multivariate models, adjusting ROC curves, and automated learning models (Machine Learning), widely used in the biosciences. As a matter of fact, during 2019, more than 65% of the studies came from research of groups belonging to the Health Sciences.

## ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLES

The Statistical Support Central Core Facility depends structurally on the ACTI of the University of Murcia and during 2019 it had the following personnel:

**Responsible:** Francisco Javier Ibáñez López ([fjil@um.es](mailto:fjil@um.es))

**Staff from Programa de Garantía Juvenil:** Irene Hernández Martínez ([Irene.hernandez@um.es](mailto:Irene.hernandez@um.es))

The aim of SAE is to offer the university members, as well as public and private institutions, the statistical analysis, using the necessary IT tools.

## RUNNING OF THE FACILITY

Researchers can Access the services offered through the IMIB Central Core Facilities website [http://www.imib.es/portal/plataformas/plataformas\\_imib.jsf](http://www.imib.es/portal/plataformas/plataformas_imib.jsf), or by the website of the unit: <https://www.um.es/web/acti/contenido/servicios/apoyo-estadistico>.

The request for services can be done using the G-SAI application linked to the Central Core Facility's website.

## LOCATION AND FACILITIES

The SAE is located on the Espinardo Campus, on the ground floor of the SACE building, where we have the facilities to perform the analysis and onsite meetings with researchers. <https://www.um.es/web/acti/contenido/servicios/apoyo-estadistico#instrumentacion>

## SERVICE PORTFOLIO

The Central Core Facility has a very wide portfolio of services and adapts to researchers needs:

- › Advice in methodology, hypothesis and experiment design, sample calculation and preparation of scientific reports.
- › Descriptive statistical analysis. Correlations.
- › Hypothesis tests. Parametric and non-parametric models. Regression models.
- › Analysis of designs with repeated measurements and mixed designs.
- › Design of questionnaires. Internal consistency, reliability and scale validation.
- › Exploratory and Confirmatory Factor Analysis. SEM.
- › Analysis of categorical models: Chi-Square, Loglinear and Logistic Regression.
- › Analysis of multivariate models. Management techniques: PCA, CA, MCA, FAMD, MFA.
- › Analysis of multivariate models. Classification techniques: KNN, classification trees, SEM, Neural Networks.
- › Analysis and adjustment of models with ROC curves.
- › Automatic learning models (Machine Learning).
- › Data Interpretation.
- › Supply of statistical software: R, SPSS, Minitab and GAMS.
- › Internships (check availability with the person in charge of the section)

## ACTIVITY 2019

The Statistical Support Central Core Facility performed a total of 26 statistical analysis, 17 of which were biosciences studies. The Central Core Facility reported results through the use of modeling techniques with ROC curves, calculation of the Interclass Correlation Coefficient (ICC), ordering and classifying in multivariate analysis and Machine Learning with prediction models based on neural networks and SVM.

We are constantly updating to provide the best service to our users and for this, we are part of the board of directors of the Association of Users of R of Spain, R-Hispanic and the board of directors of the Association of Users of R of Murcia, UMUR. Both associations have their official head quarters in our unit.

In 2019 we have participated in several informative activities, such as Science and Technology Week, where we presented our “R bingo”. We have also collaborated with other ACTI units to prepare a communication presented at the IMIB Conference.

Regarding our teaching activity, in 2019 we have collaborated in the EIDUM Doctoral

Courses: Design of Experiments and Foundations of Data Analysis (I. Statistical Research Methods: Introduction to R and Rstudio and III. Methods of hypothesis testing and design of experiments). The unit has participated in teaching courses on different areas organized by the UMU Training and Professional Development Center (Animal Experimentation Course: Calculation of sample size), and in courses organized by other units of the ACTI (XXIV course “Culture of Animal Cells: Basic Concepts and Applied Techniques” with the session “Experimental designs: growth curves and dose response curves”).

# MOLECULAR BIOLOGY CENTRAL CORE FACILITY

## CONTACT

Email: [acti.sbm@um.es](mailto:acti.sbm@um.es)

Web: <https://www.um.es/web/acti/contenido/servicios/biologia-molecular>

## OVERVIEW

The Molecular Biology Central Core Facility (SBM) of the IMIB is located in the CAID and LAIB buildings of the University Campus of Espinardo and Health Sciences, is part of the Scientific and Technical Research Area (ACTI) of the University of Murcia.

The Central Core Facility activity began in 2003 and mainly focuses on the development and application of techniques of molecular biology for the study of nucleic acids and proteins. For the study of nucleic acids, the unit has genetic analyzers and several real-time PCR machines. For the study of proteins, it has high-performance liquid chromatography (HPLC), a Q-TOF type mass spectrometer and various electrophoresis systems.

The SBM counts with equipment that allows research on the characterization and analysis of molecules, including: lipids, hormones and metabolites of very different types.

It is remarkable the implementation of “-omic” techniques in this unit and it has been strongly increased in recent years. In the field of genomics and proteomics, to the gene expression studies consolidated through DNA microarrays we will have to add the ones that installed at the end of 2019, can be used with a massive sequencing Central Core Facility (NGS, Next Generation Sequencing) and sequencing system from a single cell (Single Cell Analysis) unique in the Region. This acquisition will promote cancer research.

The proteomics / metabolomics analysis will also be greatly enhanced thanks to the forthcoming acquisition of a high-resolution microcalorimetry Central Core Facility and a nanocapillary system for mass spectrometry co-financed with the FEDER 2019 funds. Its acquisition will mean the positioning at the forefront in the field of proteomics and metabolomics at the national level for the benefit of IMIB and university research groups, as well as other regional, national and foreign organizations.

## ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLES

The SBM depends on the ACTI of the UMU

Members in 2019:

**Responsible (Head of Section):** Dr. Cesar Flores Flores ([cesar@um.es](mailto:cesar@um.es)).

**Doctors:** Dr. Alejandro Torrecillas Sánchez ([alexts@um.es](mailto:alexts@um.es)) and Dr. María José López Andreo (ma-

joloan@um.es).

**Specialist Technicians:** Vanessa Cánovas Cánovas (vanesacc@um.es), Dr. Francisco Salazar Martínez (fsal@um.es) and Dr. Inmaculada Navarro González (inmaculada.navarro@um.es).

**Specialist Technician of the *Fondo de Garantía Juvenil*:** María Gema Riquelme Rocamora (mariagema.riquelme@um.es).

The main activity of the units is to facilitate the development and maintenance of molecular biology techniques mainly related to the study of nucleic acids and proteins that the research groups require.

## RUNNING OF THE FACILITY

Researchers can access the services offered by the Molecular Biology Central Core Facility through the IMIB Central Core Facilities website [http://www.imib.es/portal/plataformas/plataformas\\_imib.jsf](http://www.imib.es/portal/plataformas/plataformas_imib.jsf) or by accessing the unit's website: <https://www.um.es/web/acti/contenido/servicios/biologia-molecular>

The request for services can be made through the G-SAI application linked to the Central Core Facility's website.

## LOCATION AND FACILITIES

The unit's facilities are located in the CAID buildings (Espinardo University Campus) and LAIB (BioSciences Campus). The full description of the equipment available in the unit can be found at the web address: <https://www.um.es/web/acti/contenido/servicios/biologia-molecular/instalaciones-y-equipamiento>

## SERVICE PORTFOLIO

Some of these services and techniques that the unit provides:

- › DNA sequencing (Sanger) and analysis of DNA fragments by capillary electrophoresis.
- › Determination of genetic fingerprint.
- › Authentication of human cell lines by STR and by DNA barcoding.
- › Real-time PCR experiments: nucleic acid quantification, gene expression studies, allelic discrimination (SNP), detection of specific and particularly interesting nucleic acid sequences (for example, of pathogenic microorganisms), HRM analysis.
- › Expression gene experiments, exons, investigation of splicing processes and study of microRNAs by hybridization and analysis with DNA microarrays.
- › Statistical analysis of expression microarrays with "Partek" and analysis of biological pathways and enrichment.
- › Determination of the quantity, quality and size of DNA, RNA and proteins using a bioanalyzer.
- › Quantification of nucleic acids by spectrophotometry (NanoDrop) and of proteins by infrared spectrometry.
- › High sensitivity fluorimetry for DNA, RNA and proteins (Qubit).

- › Molecular fractionation by ultrasonication.
- › Absorbance, circular dichroism and fluorescence spectrometry.
- › Isothermal titration microcalorimetry (ITC) and differential scanning microcalorimetry (DSC).
- › X-ray diffraction. -Laser microdissection.
- › Measurement of particlesizeby laser scatteringspectrometry.
- › HPCL separation, LC-MS separation (exactmass) and LC-MS directinjection (exact-mass).
- › Identification of proteins byanalysis of fragments digested by HPLC / ESI / MS MS.
- › Electrophoresis of one and two-dimensional proteins, in gels of different sizes.
- › Coomassie stain and MS compatible silver, in different size gels.
- › Electro-transfer of proteins to membranes (“BioradTrans-BlotSemi-Dry”).
- › Preparation and analytical ultracentrifugation.

It is important to mention that SBM provides researchers with advice in the design, execution and analysis of experiments related to all the techniques available in the unit, as well as in the writing of the technical aspects of manuscripts and publications.

In addition, provides internships of students of FP and curricular external practices for undergraduate students.

## ACTIVITIES 2019

The Molecular Biology Central Core Facility developed an intense activity during 2019, in the areas of nucleic acid study, genomics and proteomics, as reflected in the more than 17,000 analysis performed. Stands out the number of DNA sequences 2,756 and the 7,769 analysis of DNA fragments carried out, the 1,127 real-time PCR tests, the 2,211 samples analyzed by bioanalyzer and the 3,134 proteomicanalysis (includes HPLC-MS and electrophoresis). In addition, 274 transcriptomes were fully processed and analyzed by microarray assays, and another 108 analyzed without prior processing. It is also worth mentioning, the execution of 10 studies of authentication of human cell lines by microsatellites and 5 by DNA Barcoding and the 4 STR analyzes for human identification by genetic fingerprint. To the total of the mentioned analysis it would be necessary to add those carried out with other techniques to which the unit also supports.

The SBM has developed numerous activities throughout 2019 that reflect its involvement in scientific communication as shown, its participation in the Week of Science and Technology or the reception in its facilities of numerous guided visits to educational centers and other institutional visits.

On the other hand, the Central Core Facility has played an important teaching role by collaborating in the development of 5 university master’s degrees, 3 undergraduate subjects and 2 postgraduate courses, most of them related to the field of biosanitary research, with which it is intensely committed, as evidenced by her intervention in two of the communications that the ACTI has presented at the IV IMIB Conference held this year.



# BIOTECHNOLOGY CENTRAL CORE FACILITY (SEAF)

## CONTACT

Email: [acti.seaf@um.es](mailto:acti.seaf@um.es)

Web: <https://www.um.es/web/acti/contenido/servicios/agricola-forestal>

## OVERVIEW

The biotechnology central facility is part of the SEAF (Agroforestry Experimentation Section) of the ACTI, is located in the Espinardo Campus. It is part of the IMIB platforms provided by the UMU and aims to support bioprocesses with microorganisms.

It was created in 2005 to implement the technology applied to bioprocesses including product fermentation at different levels and biological agents with very diverse scopes such as: the production of bacteria, fungi and fermentation of microorganisms to obtain secondary metabolites. The facility has different downstream techniques with the necessary infrastructure to process the fermentation products depending on the requirement of each sample. The techniques used are centrifugation, tangential filtration, homogenization, atomization, microencapsulation and lyophilization for application in biosciences.

It should be mention the building works undertaken in 2018, for the design and installation of a Biological Containment Level 2 laboratory (NCB2) that houses collections from the REDESMI (Spanish Network of Microorganisms).

## ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLE

The unit structurally is part of the ACTI of the UMU and in 2019 the members were:

**Responsible (Head of Section):** Dr. Almudena Gutiérrez Abbad ([almudena@um.es](mailto:almudena@um.es))

**Laboratory Specialist Technicians:** José Antonio Sánchez Saorín ([jass@um.es](mailto:jass@um.es)), M<sup>a</sup> Mar Santiago Marín ([msantiago@um.es](mailto:msantiago@um.es)) and Ana María Fernández Pérez ([anamaria.fernandez9@um.es](mailto:anamaria.fernandez9@um.es))

**ResearchAssistant:** Manuel Fernández Baños ([mfb@um.es](mailto:mfb@um.es))

The basic function of the platform is to facilitate the development and maintain the production technologies required by teaching and research staff.

## RUNNING OF THE FACILITY

Researchers can access the services offered by the unit through the IMIB platforms website [http://www.imib.es/portal/plataformas/plataformas\\_imib.jsf](http://www.imib.es/portal/plataformas/plataformas_imib.jsf) or by accessing the SEAF website: <https://www.um.es/web/acti/contenido/servicios/agricola-forestal>

The application for services can be made through the G-SAI application linked to the

platform's website.

## LOCATION AND FACILITIES

The unit is located in the CAID building of the Espinardo Campus.

The detailed information on the equipment available on the platform can be found at the following web address: <https://www.um.es/web/acti/contenido/servicios/agricola-forestal/instalaciones-y-equipamiento>

## SERVICE PORTFOLIO

A list of services available is listed below:

- › Production of microorganisms (biological agents, including genetically modified organisms) through fermentation in a bioreactor.
- › Advice on the design of bioreactor culture assays for biological agents to be used in food and / or biohealth industry.
- › Culture of anaerobic microorganisms.
- › Lyophilization of deep-frozen material, of volumes from 100  $\mu$ L to 500 mL.
- › Drying by atomization, and encapsulation of samples (up to a volume of 5L) by Mini Spray-Dryer for encapsulation in micro and nanospheres.
- › Filtering or concentration of samples in large volumes (minimum 10 L), by tangential filtration system with different pore sizes.
- › Centrifugation phase separator and centrifuge for volumes up to 3.2 L.

## ACTIVITIES IN 2019

The platform has supported a total of 28 research groups, mainly from the UMU and other public research organizations in the region, such as CEBAS-CSIC. In addition, it has collaborated in the R&D activity of several private companies, which have demanded the services offered by the unit and it is reflected in the use of the equipment, as is the case of the freeze dryer (5,430 hours of sample processing) and bioreactors (61 fermentation processes of 48-72 hours and 10 fermentation processes for more than 60 days).

Teaching is part of the activity and it is evident from the collaboration in internships for students of different degrees, teaching in doctoral programs and in the UMU Aula Senior. It is also remarkable the participation of the staff in the ACTI Biosafety Working Group and their presentation in the 1st edition of the UMU "Biosafety" course.

In 2019, the central core facility has participated in several informative activities, including talks requested by regional educational centers and the contribution to the activities organized by ACTI at the annual edition of Science and Technology Week.

The increasing involvement of the facility with the research undertaken at the IMIB is evident by the drafting of two communications in biohealth applications that have been presented at the IV IMIB Conference.

# PSYCHOLOGICAL INSTRUMENTATION CENTRAL CORE FACILITY

## CONTACT

Email: [suip@um.es](mailto:suip@um.es)

Web: <https://www.um.es/web/acti/contenido/servicios/instrumentacion-psicologica>

## OVERVIEW

The University Section of Psychological Instrumentation (SUIP) is located on the Espinardo Campus and is part of the Scientific and Technical Research Area (ACTI) of the UMU. Since it was created in 2000, aims to provide infrastructure (facilities, instrumentation, etc.) and advice to teaching and research personnel interested and / or specialized in psychological and health research in different lines.

Most the activity is focus on the development and application of techniques in health and education (psychology, medicine, dentistry, nursing, education, etc.), highlighting the protocol for the acquisition of clinical skills in health professionals, that is part of the rotation system of the School of Medicine of the UMU, and also of the Master of Anatomy Applied to the Clinic.

Another important line of action of the unit is the use of protocols for the analysis and study of emotions through changes in facial expression in different situations of exposure and coping.

The Central Core Facility manages the development of fully customizable questionnaires, of any size and with multiple conditional options (show or hide questions based on answers to previous questions, anonymous questionnaires, measurement of time spent answering a question or all of the questionnaire, multilingual questionnaires, questionnaires of free access or with an access password, and also through invitation, maintaining anonymity). All these survey options are clearly useful in research carried out by the IMIB groups

## ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLES

The Psychological Instrumentation Unit depends on the Scientific and Technical Research Area (ACTI) of the UMU.

In 2019 the Instrumentation Central Core Facility members were the following:

**Responsible (Head of Section):** Dr. Pedro Castell Gallud ([pcastell@um.es](mailto:pcastell@um.es))

**Specialist Technician:** Juan Manuel Vivancos Molinero ([jmvm@um.es](mailto:jmvm@um.es))

The basic function of the SUIP is to provide infrastructure (facilities, instrumentation, etc.) to teaching and research personnel and / or researchers that require a specialize job in psychological and health research.

## **RUNNING OF THE FACILITY**

Researchers can access the services offered by the Psychological Instrumentation Central Core Facility through the IMIB Central Core Facilities website [http://www.imib.es/portal/plataformas/plataformas\\_imib.jsf](http://www.imib.es/portal/plataformas/plataformas_imib.jsf) or by accessing the Central Core Facility´s website <https://www.um.es/web/acti/contenido/servicios/instrumentacion-psicologica>

The request for services can be made through the G-SAI application linked to the Central Core Facility's website.

## **LOCATION AND FACILITIES**

The SUIP is located on floor -1 of the SACE building on the Espinardo University Campus and has available different experimentation rooms and specialized equipment:

- › 3 Behavioral Observation rooms equipped with unidirectional mirror.
- › One Human Experimentation Booth (soundproofed and prepared for psychophysiological records with temperature, humidity and light control).
- › One Diagnostic Room (for taking tests, interviews, applying treatments, etc.).
- › Sleep Study Room.
- › Laboratory for Psychological Tests.
- › Closed circuit of audio and video recording for digital and analog support.
- › EEG and PE equipment.
- › 35-channel polysomnographs (EGP800) and SomnoScreen.
- › N-Linear editing equipment.
- › Virtual reality equipment.
- › Post production equipment.

It is worth highlighting that all the experimentation rooms have cameras and audio and video recording systems to properly record the research performed whenever is required.

Detailed information on the unit's equipment can be checked at: <https://www.um.es/web/acti/contenido/servicios/instrumentacion-psicologica/instalaciones-e-instrumentacion>

## **SERVICE PORTFOLIO**

Some of the main services offered by the SUIP are:

- › Consulting in Psychological Instrumentation.
- › Evaluation / Application in Psychological Instrumentation.
- › Psychological treatment.
- › Behavioral analysis: Implementation of systematic observation protocols using coding systems and behavioral analysis. Support in a number of processes, replicability and

re-checking.

- › Facial analysis of micro-expressions: to study emotions in any given situation, exposure and reaction with facial expressions. To establish different profiles of behavior using units of action of facial microexpressions.
- › Personalized development, implementation and correction of different types of questionnaires.
- › Psychological applications of virtual reality (creation and customization of virtual tours with possibility of interacting and to modify them adapt them to the required needs).
- › Implementation of augmented reality experiences for mobile devices.
- › Psychological applications with ICTs: monitoring-follow up treatment / therapy.
- › Postproduction of audiovisual resources (supporting the process of 3D illustration creation and the production of motionsgraphics).
- › Simulation of situations of doctor-patient interactions (to evaluate the response to different situations of students of Medicine, Nursing, Dentistry, Psychology and any other related discipline).
- › Recording of educational material for online training or additional to onsite training.

## ACTIVITY 2019

The Psychological Instrumentation Central Core Facility reported an intense activity in 2019 as can be seen in the following data: 2,800 hours of PI evaluation / application, 2,100 hours of room usage, 1,900 hours of consulting in Psychological Instrumentation, 500 hours dedicated to behavioral analysis and 450 providing psychological treatment. A very large part of the activity have been carried out for groups of the IMIB, showing the clear relationship between the unit's activity and bioscience research.

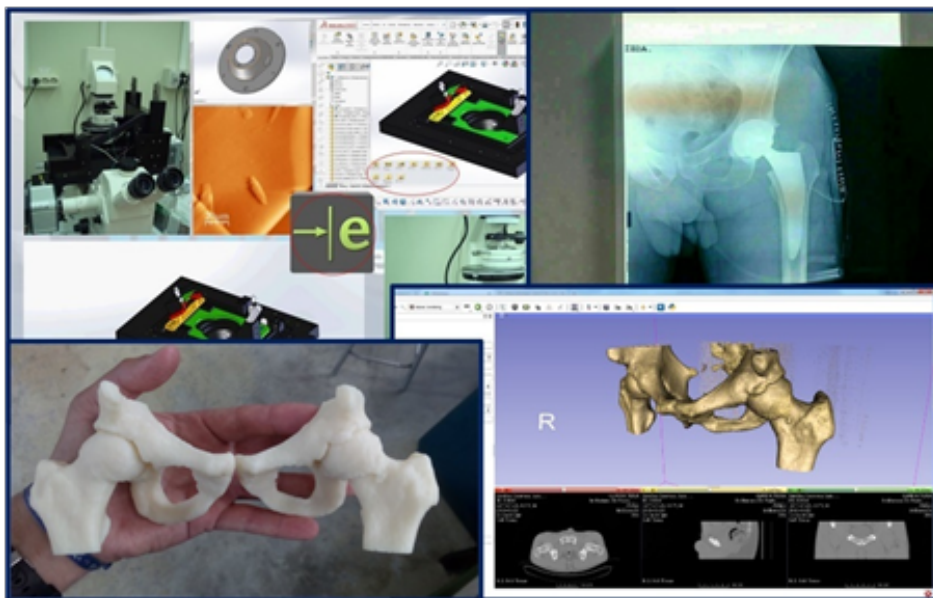
Staff from the SUIP has taught in three master's degree and has participated in the IMIB Conference sending one communication. In addition, the unit has collaborated in educational visits to the ACTI, and has been present, in the 2019 annual edition of Science and Technology Week.

# RESEARCH SUPPORT WORKSHOPS CENTRAL CORE FACILITY

## CONTACT

Email: [acti.taim@um.es](mailto:acti.taim@um.es)  
[acti.taie@um.es](mailto:acti.taie@um.es)

Web: <https://www.um.es/web/acti/contenido/servicios/apoyo-investigacion>



## OVERVIEW

The Research Support Workshops Central Core Facility (TAI) was created in the early 1980s due to the necessity to design and build and maintain scientific equipment. Most of the equipment and facilities have been acquired thanks to FEDER funds (European Regional Development Funds).

The TAI Central Core Facility, is part of the ACTI of the UMU and it is located in the CAID building of the Espinardo University Campus. The main services are: technical advice in the design and manufacture of equipment, repair, maintenance adjustment and calibration of instruments and laboratory equipment, preparation of teaching material, manufacturing of pieces difficult to locate and purchase and the development of projects of design and manufacturing of scientific equipment tailored to researchers.

The unit has started to work from basic equipment and built more complex structures adapting to the needs of the users. At this point we have reached the so call “Industry 4.0”, or “Fourth Industrial Revolution” led by the incorporation of new technologies into the production process.

3D design and computer numerical control, additive manufacturing, 3D scanning and reverse engineering, finite element simulation and calculation, virtual and augmented reality or the Internet of Things are technologies increasingly in demand and part of our routine work.

In 2019 we made a significant investment in technology, adding the “Einscan Pro 2X +” to our equipment, a new structured light scanner, and the “GeomagicWrap” software for the treatment of point clouds, a new professional printing equipment 3D FDM, and a machine center capable of working up to 5 axes simultaneously, co-financed with FEDER funds. The acquisition of this equipment completes our technological resources, to provide better support in the design and execution of devices currently being manufactured on request of IMIB research groups, such as dental implants, surgical guides, chronobiological sampling equipment, IVF instruments or customization for 3D printing of anatomical models for scheduled surgeries.

## ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLES

The Research Support Workshops Central Core Facility depends on the UMU ACTI.

In 2019 the members of the Unit were the following:

**Responsible (Head of the Unit):** Juan Miñarro García (jmg@um.es)

**Faculty:** Fernando Ruiz Abellán (Taller de Electrónica, fra@um.es)

**Specialist technicians:** Juan Francisco Miñarro Jiménez (Taller de Mecánica, jfmj@um.es) and Alfonso Guzmán García (Taller de Vidrio, aguzman@um.es).

The goal of the TAI Central Core Facility is to offer researchers the possibility of designing, construction and maintenance of scientific equipment and 3D printing products.

## RUNNING OF THE FACILITY

Researchers can access the services offered by the TAI Central Core Facility through the IMIB Central Core Facilities website [http://www.imib.es/portal/plataformas/plataformas\\_imib.jsf](http://www.imib.es/portal/plataformas/plataformas_imib.jsf) or accessing the unit website <https://www.um.es/web/acti/contenido/servicios/apoyo-investigacion>

The request for services can be made through the G-SAI application linked to the unit’s website.

## LOCATION AND FACILITIES

The Research Support Workshops Central Core Facility, made up of the Electronics,

Mechanics and Glass workshops, is located in the CAID building of the Espinardo University Campus.

State-of-the-art equipment and software are available for 3D design and printing, reverse engineering processes, programming of computer numerical control machine tools, or finite element simulation analysis.

Detailed information on the unit's equipment can be found on the website: <https://www.um.es/web/acti/contenido/servicios/apoyo-investigacion/instalaciones-e-instrumentacion>

## SERVICE PORTFOLIO

Some of the services offered by the Central Core Facility are:

- › Technical advice in the design and manufacture of equipment.
- › Repair and maintenance of laboratory instruments and equipment.
- › Adjustment and calibration of instruments.
- › Preparation of teaching material.
- › Manufacturing of parts difficult to purchase on the market.
- › Development of projects to design and manufacture of customized scientific instruments (From the initial idea of the researcher, we put everything into the suitable mechanical and / or electronic design of the device, then we do manufacture each of the components separately with all the technical tools available. The final step is the assembly of the device and programming of the controllers to deliver it fully functional).
- › Collaboration in the preparation of technical paperwork to use in scientific publications or for the application of possible associated patents.

## ACTIVITY 2019

The Research Support Workshops Unit has experienced an increasing demand every year, and in 2019 it has managed about 200 services applications, most of them being projects for designing and manufacturing of scientific equipment tailored for different projects and research groups.

In addition to the services provided to research groups of the IMIB, the UMU and other public institutions, the unit collaborates with a great number of private companies, mainly for the execution of projects for the quick development of prototypes and 3D printing. In 2019, some of these companies were: Fini Golosinas (Grupo Sánchez Cano), Llao Maquinaria, Navantia, Hitachi, El Pozo and companies with bioscience application, such as Voptica and Kronohealth.

In 2019, the highly specialized and trained staff of the Unit has been asked to participate in a large number of scientific communication events related to design and 3D printing, such as Solidworks design and engineering software "Cimworks X -Pert Day", nationally organized by the Cimworks company at the Centro Europeo de Empresas e Innovación de Murcia (CEEIM), or



the II Congress on additive manufacturing“ Additive 4.0 ”. In addition, the TAI has participated with a communication in the IMIB Conference of this year, taught in several courses organized by the UMU, has held informative talks for undergraduate and master’s students, and participated in guided visits from educational centers of the region.

The Mechanical Workshop has been present in the ACTI stand at the Science and Technology Week, contributing with the presentation of the design software “Solid works app for kids”, two models of dissection of a frog printed in technology 3D, 3D laser scanning, a sample of scientific experiments related to Physics and Mechanics and different examples of the use of additive manufacturing (3D printing) to our work, especially in biosciences.

# RADIOPROTECTION AND WASTE CENTRAL CORE FACILITY

## CONTACT

Email: [acti.srr@um.es](mailto:acti.srr@um.es)

Web: <https://www.um.es/web/acti/contenido/servicios/radioproteccion-residuos>

## OVERVIEW

The Radioprotection and Waste Central Core Facility (SRR) is part of the Scientific and Technical Research Area of the University of Murcia (ACTI) and, in the area of radiation protection, offers the IMIB research groups authorized radioactive facilities, equipment and the necessary tools to work with ionizing radiation, as well as advice and specialized personnel (supervisors and operators for radioactive facilities).

At the Espinardo and Biosciences Campus, the Unit has suitable facilities available for the development of tests, up to containment level 2, that may require the culture of cells and tissues with radioactive isotope. All this is of great interest to perform certain tests otherwise impossible to carry out in other facilities in the region.

The Radioprotection and Waste Central Core Facility is responsible for the correct managing all of the radioactive waste classified as dangerous, including (biosanitary, cytostatic and cytotoxic and laboratory chemicals, among other groups) the generated by the research groups of the UMU, as well as the waste generated by the IMIB Central Core Facilities, in the facilities located in Espinardo, the CEIB and LAIB buildings of the Biosciences Campus.

## ORGANIZATIONAL STRUCTURE, MEMBERS AND ROLES

The Central Core Facility depends on the ACTI of the UMU and in 2019 the members were:

**Responsible (Head of Unit):** Dr. María Dolores Alcázar Fernández ([alcazar@um.es](mailto:alcazar@um.es))

**Specialist technician:** Dr. Régulo Ángel Cánovas Ciller ([rcciller@um.es](mailto:rcciller@um.es))

**Senior technician of the MINECO:** Antonia Yolanda Álvarez Portella ([ayolanda.alvarez@um.es](mailto:ayolanda.alvarez@um.es)).

The section offers the university scientific community and other research institutions the certified radioactive facilities, equipment, tools needed to work with ionizing radiation, advice and specialized personnel (supervisors of radioactive facilities). In addition, it deals with the handling and disposal of radioactive waste generated at the University facilities.

## RUNNING OF THE FACILITY

Researchers can access the services offered by the Radioprotection and Waste Central Core Facility through the IMIB website [http://www.imib.es/portal/plataformas/plataformas\\_](http://www.imib.es/portal/plataformas/plataformas_)

imib.jsf or by accessing the unit's website <https://www.um.es/web/acti/contenido/servicios/radioproteccion-residuos>

The request for services can be done through the G-SAI application linked to the Central Core Facility's website.

## LOCATION AND FACILITIES

The Central Core Facility has facilities both in the Espinardo and in the Biosciences Campus.

The complete list of equipment is available on the website: <https://www.um.es/web/acti/contenido/servicios/radioproteccion-residuos/equipamiento>

In addition to the laboratories already mentioned, the unit has a waste warehouse and a large number of collection cages distributed throughout all UMU campuses to facilitate the management of waste generated by research groups.

## SERVICE PORTFOLIO

Some of the most important services offered by the unit, are:

- › Advice and training to researchers in issues related to radiation protection.
- › Certified radioactive facilities, equipment and tools for working with ionizing radiation.
- › Advice, facilities and tools for working with cell and tissue culture labeled with radioactive isotopes of biological containment level 2.
- › Management, control and reception of radioactive material ordered by researchers.
- › Management of dosimeters (personal, ring and area) including monthly change, referral to the company (Dosimetry Center), preparation and safekeeping of dosimetric reports, management of registries and discharges and notification to the *Servicio de Medicina de Empresa* of the UMU for specific radiation medical examinations.
- › Advice and management of the containment, identification and removal of radioactive waste derived from tests carried out by UMU researchers at the radioactive facility.
- › Advice and management of the containment, identification and removal of hazardous waste (chemical and biological) to researchers at the UM and IMIB.
- › Processing of alcohol documentation with special taxes exemption.
- › Preparation and submission of the questionnaires of cataloged chemical substances used in the UMU to the *Centro de Inteligencia Contra el Crimen Organizado del Ministerio del Interior*.

## ACTIVIDADES 2019

Throughout 2019, the Radioprotection and Waste Central Core Facility has developed intense activity. This is reflected in the high number of samples processed in the facilities: 450 samples irradiated with X-rays, 172 samples processed with liquid scintillation counter (beta) and 1322 with solid (gamma).

In addition, the staff of the unit has been responsible for the environmental radiological surveillance of all the ACTI facilities, of the radiological surveillance of the UMU ionizing radiation equipment and has coordinated the visits made by the Consejo de Seguridad Nuclear. Regarding waste management, the Central Core Facility has managed, in accordance with all current legal regulations, more than 75 tons generated by research activity.

The main group of processed waste corresponds to what is classified as biosanitary waste, followed by cytotoxic and cytostatic substances. This is very significant data on the unit's participation in the investigations carried out by the research groups of the IMIB.

In addition, the SRR has carried out numerous management and advisory activities related to the execution of radioactive tests and the use of dangerous substances in multiple research tests at the IMIB. The Central Core Facility has given seminars for the training of new users of the radioactive facility (IRA-1684) and the staff is in constant training and is part of several commissions and committees such as: the Comisión Técnica de Bioseguridad del ACTI y los Comités de Bioseguridad en Experimentación y de Seguridad y Salud, both from the University of Murcia. Furthermore, it has participated in the IMIB Conference this year sending two communications and being present in various informative events such as the annual edition of Science and Technology Week.

