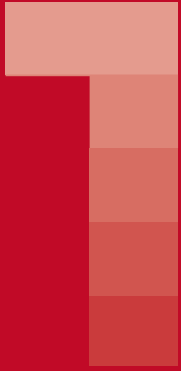


2022

RESEARCH
AND TEACHING
REPORT BST



/Salut



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**Anna
Millán
Álvarez**
General Director

Foreword by the CEO

Spearheading advanced therapies

We present the Research and Education Report 2022, which provides, at a glance, all the research and education work that the Banc de Sang i Teixits (Blood and Tissue Bank, BST) carries out in just one year. Intense research activity, the number of publications, the trials and projects initiated with research teams from all over the world, some international recognitions that fill us with pride and the large number of studies are just some of the achievements that have made this institution a benchmark.

We are closing a chapter with all objectives met with absolute success, which has allowed us, during this year, to begin to lay the foundations for a new Strategic Plan (2024-2028). This new roadmap should be the guide to socially consolidate our past and future scientific path, especially as a research pool for advanced therapies. We are expert generators and researchers in this field at international level and have a clear vocation to work with the objectives of the public health system. We will make the necessary effort to make the Advanced Therapies Hub of Catalonia a reality. Our daily life has been going in this direction for years.

However, all this would not be possible without the human team that makes up the BST, from the new scientific director who I am sure will expertly guide us in establishing new lines for the future, to each of our colleagues in the laboratories, in the clean rooms, at the computers tabulating data or directing our referral laboratories and research areas. All of them and their perseverance and excellence are what have put us where we are, leaders in research to improve the lives of patients now and in the future.

Anna Millán Álvarez





Joaquim Delgado Duarte
Scientific Director

Foreword by the Scientific Director

Research: the DNA of the BST

I am pleased to present the BST Research and Education Report for the year 2022.

This year, we close a cycle of more than six years associated with the implementation of the previous Strategic Plan for research, which has allowed us to consolidate high-quality scientific projects, together with other national and international research teams and institutions. We can safely say that our scientific production and the effects derived from all that we generate have positioned us as a benchmark institution in many aspects.

The research activity of the BST, comprising a wide range of research projects, clinical trials and publications, is a vital part of our institution's day-to-day work, thanks to the great team of professionals that make up all the departments involved in this work. Working to push this whole task forward has been my main motivation this first year, after taking over from Dr Joan Garcia as scientific director of the institution. I take on this responsibility with the knowledge acquired after years working with the same objective in the organisation.

We have consolidated the foundations for a new Strategic Plan, a roadmap that will allow us to face the new challenges we have already taken on, especially in regard to advanced therapies, and which we can already say will provide much of the knowledge to become the future and hope of many patients in the coming years. We are a centre of innovation and research excellence and the figures for 2022 prove it. We are doing more research than ever before, publishing more than ever before and, above all, laying the foundations for further growth and innovative knowledge. It is in our DNA.

Joaquim Delgado Duarte

2022 highlights

- **The Transfusion Safety Laboratory** has published the experience of a decade of HTLV screening in blood donations. This study have shown that although Catalonia is not considered an endemic area of HTLV, the virus is circulating among our donors and therefore reinforces the need for screening. The hepatitis E research line has also published an article on microRNAs in the different clinical manifestations of the infection.
- **The Congenital Coagulopathies Laboratory – Genomics Platform** has participated in the epidemiological surveillance of SARS-CoV-2 carried out by the Department of Health by performing the complete sequencing of the virus. This has been done in collaboration with the Enhancing Whole Genome Sequencing consortium and/or Reverse Transcription Polymerase Chain Reaction national infrastructures and capacities to respond to the COVID-19 pandemic in the EU and European Economic Area. It has published around 900 sequences, from January 2022 to March 2023, in the local VARCO network and the international GISAID.
- The team has been awarded two research prizes: “International Award for Research in Clinical Medicine” from the Royal Victoria Eugenia Foundation for the work “Approaching the molecular bases of congenital platelet disorders integrating the study of the genome, the transcriptome and the use of artificial intelligence” and “National Award for the result of scientific research” from the Cuban Academy of Sciences for the study “Molecular characterization of Cuban patients with Hemophilia through next generation massive sequencing studies.”
- In the field of developing molecular microbiology strategies, a comparative study has been carried out between massive and third-generation sequencing when characterizing the seminal microbiota of idiopathic infertile patients. In collaboration with the microbiology laboratory of the BST, different protocols have been developed for the rapid detection of sterility. The detection of Cutibacterium Acnes in cord blood samples is already being used in the research project led by the Cord Bank “Transfusion of extremely premature babies with red blood cells from umbilical cord blood”.

Silvia Sauleda



Fran Vidal



- **The Immunohaematology Laboratory** has published an article about ABO gene editing describing the conversion of blood type A to universal type O in Rhnull donor-derived human-induced pluripotent stem cells.
- **The Cell Therapy Service** has created the iPSC bank from homozygous umbilical cord cells for representative HLAs with access to up to 25% of Spanish population. They have also developed the bank of T cell defenses based on representative HLAs with access to up to 80% of Spanish population (TCelBanc).
- The first patient of the trial that evaluates the safety and efficacy of tumour infiltrating lymphocytes (TIL) for treatment of solid tumours has received the medicinal product manufactured by BST.
- The ATMP Manufacturer (FTA) has been authorized by the Spanish Medicines Agency (AEMPS) to manufacture the medicinal product evaluated in the TRACE project (specific T cells for tri- viruses, CMV, EBV and ADV) to supply the Spanish participating centers in the clinical trial.
- **The Histocompatibility and Immunogenetics Laboratory** has optimized and validated the HLA typing technique using next-generation sequencing (NGS) for the classification of relapse in the post-transplantation of hematopoietic progenitors (classic vs HLA loss).
- Through the application of next generation sequencing, the HLA, KIR and other genes involved in the response of NK cells have been studied in patients with acquired haemophilia. This study is led by the Congenital Coagulopathies Laboratory together with the Vall d'Hebron Hospital.
- **The Tissue Bank.** The Health Programme of The European Union has funded EGALITE (European Group for Accreditation and Liaison of Blood-Tissues and Cells Establishments) to promote the harmonization of practices in donation centers and blood and tissue banks.

Nuria Nogués



Sergi Querol



**Banc
de sang
i
teixits**

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Banc de Sang i Teixits

The Banc de Sang i Teixits (Blood and Tissue Bank, BST) is a public company of the Ministry of Health whose mission it is to guarantee the supply blood of sufficient quality for all citizens of Catalonia. The BST manages and administers the donation, transfusion, and analysis of blood and blood plasma. It also acts as a centre for obtaining and processing tissues and umbilical cords and develops other lines of action as a centre specialising in immunobiology, molecular analysis, cell therapy and regenerative medicine.

- It constitutes the backbone of the haemotherapeutic system in Catalonia.
- The BST's activity extends to all public and private centres in Catalonia and other areas of Spain, providing personal service to both donors and customers.
- Its aim is to function as a first-class centre for management, innovation and research in haemotherapy and tissues.

The BST participates in its own research projects and works in collaboration with all the Catalan Health Institute centres, many of the centres in the Public Hospital Network and Catalan universities. In addition, it works to promote strategic alliances with centres, researchers and industry.

1.1. Governing Bodies

The Banc de Sang i Teixits' governing bodies are the Board of Directors and its committees.

1.1.1. Board of Directors

Chair

Andreu Mas-Colell

Vice Chair

Ignasi Carrasco Miserachs

Secretary

Cristina Ortiz González

Members

Núria Montserrat Pulido

Irene Garcia Cadenas

Xavier Aldeguer Manté

Judit Vall Castelló

Ivan Planas i Miret

Antoni Castells Garangou

Joan Comella Carnicé

1.2.

Executive and Management Bodies

1.2.1. Executive Committee

CEO
Anna Millán Álvarez

**Director of Human
Resources**
Imma Garcia Pursals

**Director of
Communication
and Marketing**
Pilar Córdoba Tejero

**Corporate Director and
Head of Information
Technologies**
Antoni Masi Roig

Healthcare Director
Joan Ramon Grífols Ronda

**Strategic Planning and
Advanced Therapies
Director**
Joaquim Delgadillo Duarte



1.3.

Advisory Bodies

1.3.1. Internal Scientific Committee

The Internal Scientific Committee is the advisory body in charge of ensuring that all tasks in the organisation involving the promotion and development of RDI are carried out.

The tasks performed by this committee include:

- Reviewing RDI policy and ensuring that it be disseminated and adopted.
- Coordinating the deployment of the Strategic Research Plan (SRP) and evaluating its degree of success.
- Ensuring that the annual RDI objectives are met.
- Overseeing activities associated with the technology observatory (surveillance, foresight, analysis, etc.).
- Periodically reviewing scientific production, economic aspects and research staff.
- As the unit responsible for the programmes, participating in research activities and evaluating projects' progress (anticipating deviations and problems).
- Reviewing the systematics of the process for continuous improvement.

Composition

Cristina Castells Sala
Ruth Coll Bonet
Joaquim Delgadillo Duarte
Raquel Gil Muro

Joan Ramon Grífols Ronda
Alejandro Madrigal
Núria Nogués Gálvez
Sergi Querol Giner

Sílvia Sauleda Oliveras
Elisabet Tahull Navarro
Francisco Vidal Perez
Joaquim Vives Armengol

reviewing R&D&I
coordinating Strategic
Research Plan
ensuring annual R&D&I
Overseeing activities
associated technology watch
reviews scientific
production
evaluating projects'
progress
continuous improvement

1.3.2. External Scientific Committee

The new SRP has re-established the External Scientific Committee. The tasks to be performed by this committee include the following:

- Annually evaluating the RDI activity carried out at the BST.
- Giving opinions and making suggestions on the adequacy and follow-up of the SRP.
- Making recommendations on research lines and programmes (promoting, auditing, redirecting, etc.).
- Giving guidance on how to increase external resources for research and on possible alliances to be established.
- Acting as an external technology observatory.

Composition

Prof. Alejandro Madrigal, MD, PhD (president).

Scientific Director of the Anthony Nolan Research Institute, London (UK)

Prof. Catherine Bollard, MD, MBChB

Director of the Center for Cancer and Immunology Research at the Children's National Research Institute, Washington DC (USA)

Prof. Antony Atala, MD

Director of the Wake Forest Institute for Regenerative Medicine, North Carolina (USA)

Prof. Masja de Haas, MD, PhD

Senior researcher at the Dept of Clinical Transfusion Research, Sanquin, and at the Dept. of Immunohaematology and Blood Transfusion, Leiden University Medical Centre (LUMC), Leiden (Netherlands)

Annually evaluating
R&D&I in the BST
opinions suggestions
adequacy follow-up
recommendations
programmes research
promoting auditing redirecting
guidance external
resources for research
external technology observatory

1.4.

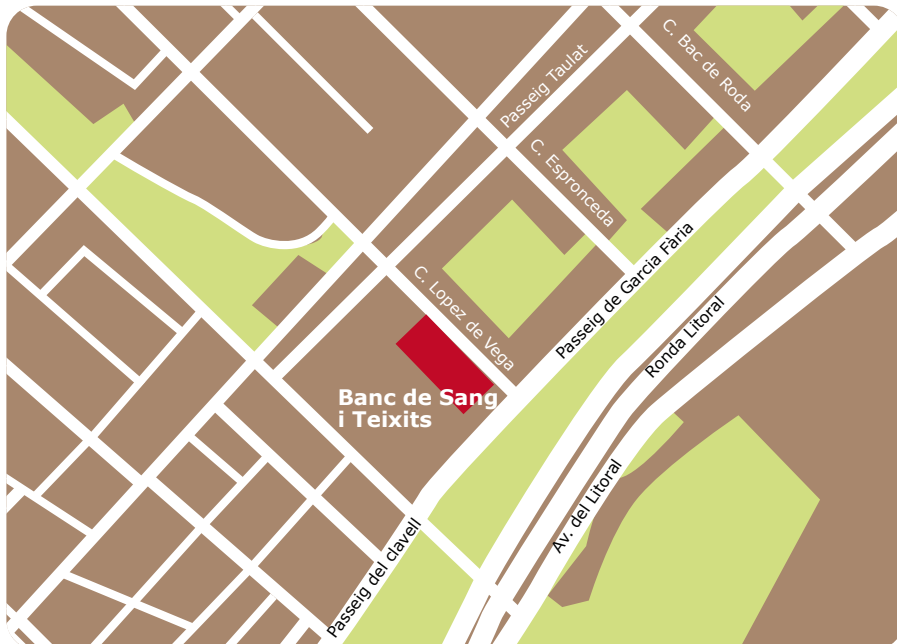
Location

Pg. del Taulat 106

The corporate headquarters of the BST is located at the corner of Passeig Taulat and Carrer de Lope de Vega, in the 22@ technology district of Barcelona. It is from this headquarters that the various lines of activity and many of the organisation's professionals are centralised. The BST also has offices in the main hospitals in Catalonia.



800
professionals



technological
district
22@
in the Barcelona

1.5.

Summary of research activity

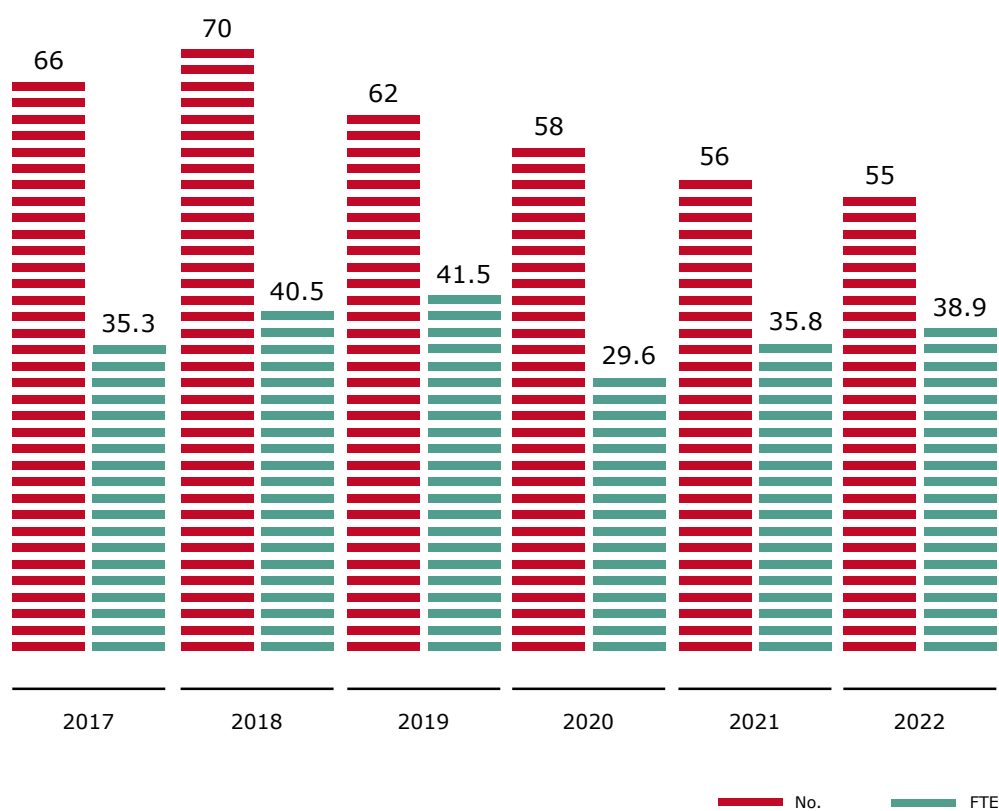
1.5.1. Research and technical staff

Research and technical staff 2022

	No.	FTE	No. of men	FTE of men	No. of women	FTE of women
Principal investigators	6	3.2	4	2.1	2	1.1
Senior researchers	26	18.5	4	2.3	22	16.2
Researchers	18	12.6	5	2.9	13	9.7
Support staff	5	4.6	1	1.0	4	3.6
TOTAL	55	38.9	14	8.3	41	30.6

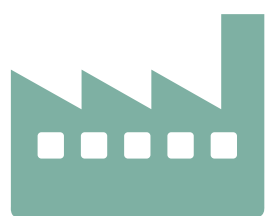
* FTE: full-time employees

Research staff since 2017



1.5.2. Economic data

Research funding 2022



144,544€

Agreements with industry



2,610,081€

Own funds*

* Includes expenses for full-time or part-time staff and internal research funding

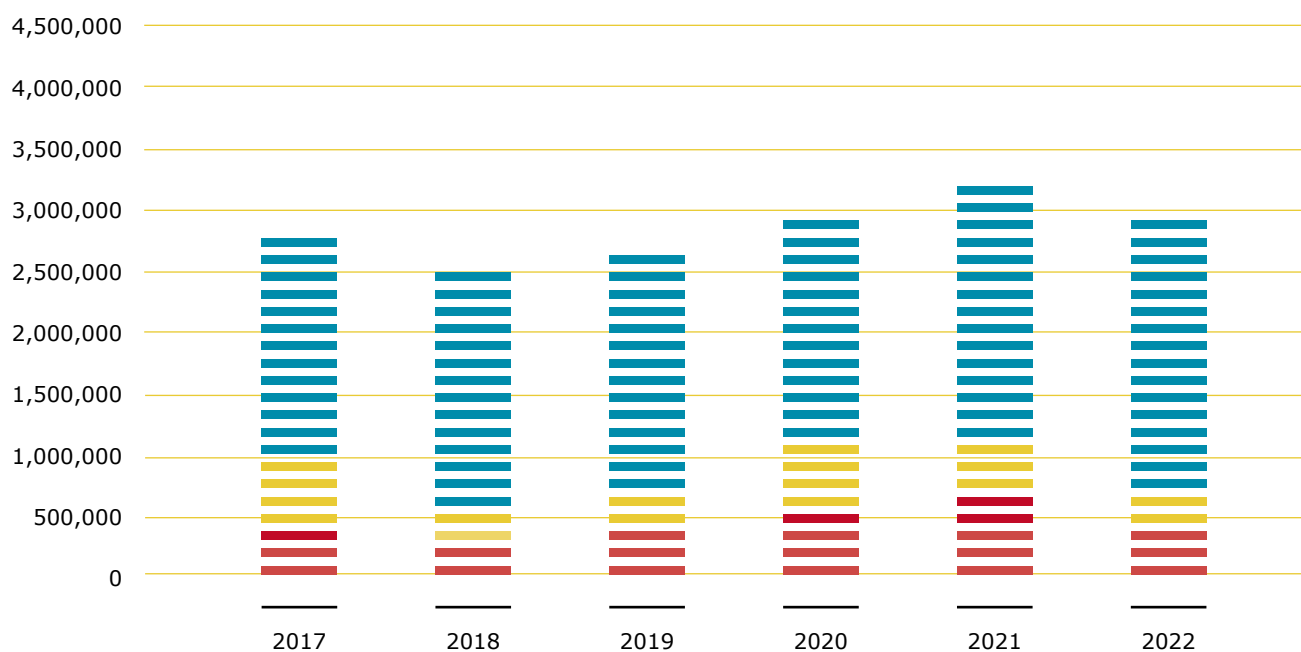


170,106€

Public agencies

Total 2,924,731€

Research projects



* From 2017 only direct costs have been taken into account

Projects financed by public agencies

Agreements with industry

Own funds*

1.5.3. Organisation of research at the BST

The Strategic RDI Plan 2017-2020 set up five research programmes

R&D&I
2017-2020

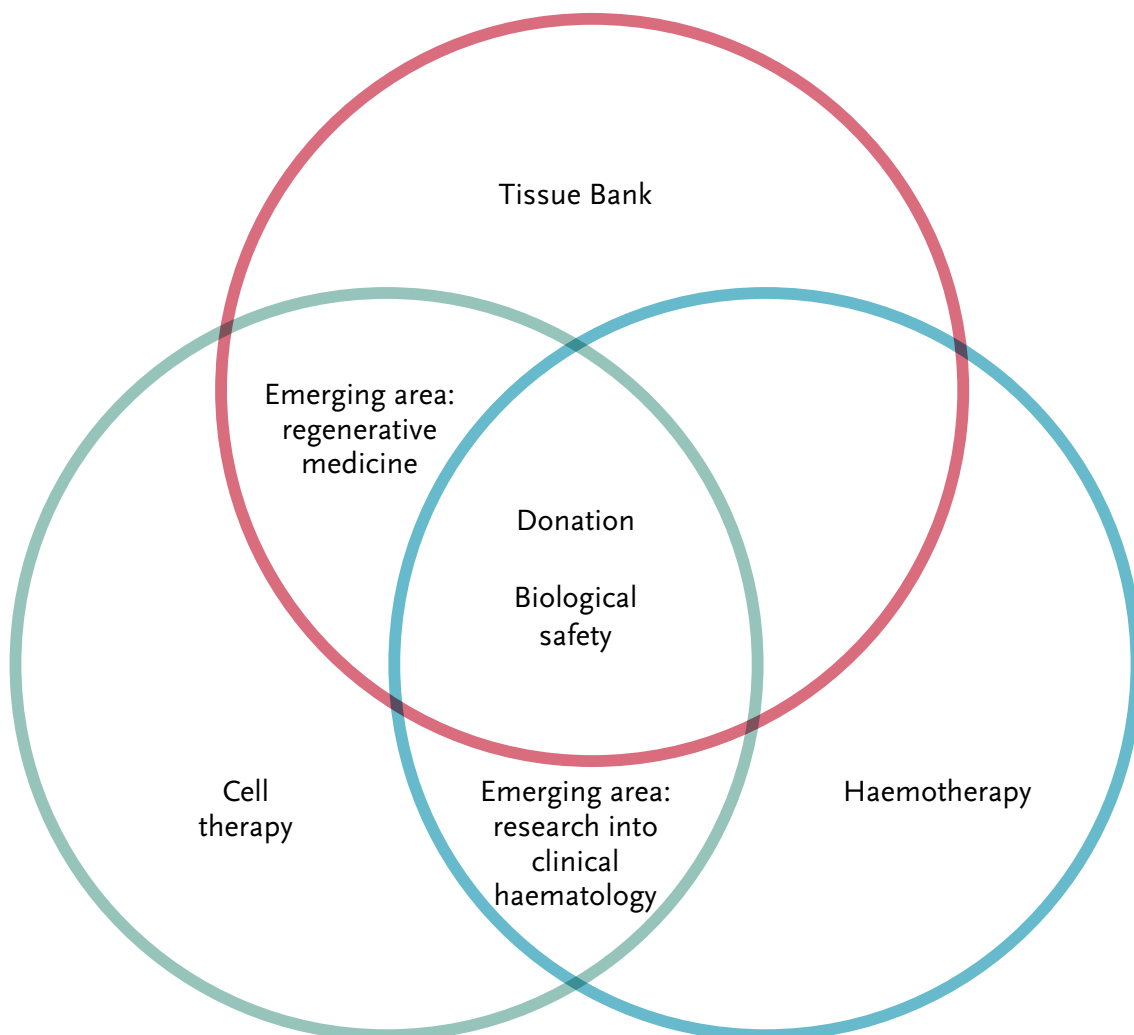
5 Research Programmes

Three core programmes:

- **Haemotherapy:** immunohematology, transfusion, molecular diagnosis, process development
- **Tissue bank:** development of products and processes of the tissue bank, regenerative medicine
- **Cell therapy:** transplant immunobiology/immunotherapy, regenerative medicine

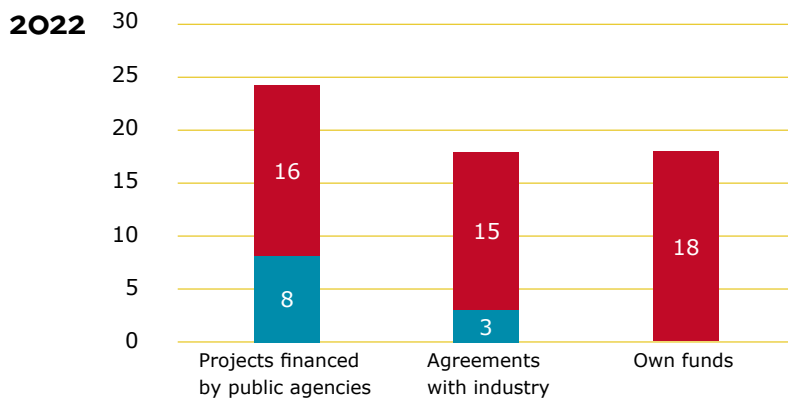
Two transversal programmes:

- **Biological safety:** emerging pathogens, epidemiological studies, harmonisation between products
- **Donation of blood, cells and tissues:** study of donation behaviours, donation ethics, donation promotion, protection, well-being and comfort of the donor



1.5.4. Research projects

Research projects



Active projects during 2022

ACTIVE PROJECTS DURING 2022	BST PRINCIPAL INVESTIGATOR	COLLABORATION
PUBLIC AGENCIES		
Carlos III Institute of Health	4	8
European Commission	1	1
Health Department of Catalonia		1
IDIBAPS		1
Ludwig Maximilians Munich University		1
Spanish Investigation Agency	6	
Spanish Knee Society		1
AGREEMENTS WITH INDUSTRY		
Achilles Therapeutics Limited		1
Adaptimmune Therapeutics PLC.		2
Allovir Inc.		1
ALX Oncology Inc.		2
Atara Biotherapeutics Inc.		1
Autolus Limited		1
Celgene Corporation		1
Cellnex Telecom S.A.		1
Gilead Sciences Inc.		1
Kite Sciences Inc.		1
Igenomix		1
Instituto Grifols S.A.	1	
Lion Biotechnologies Inc.		1
Miltenyi Biomedicine GmbH		1
Novartis Pharma AG		1
T-knife GmbH		1
OWN FUNDS		18
TOTAL		60

1.5.5. Doctoral theses

These were the theses read by BST researchers

Obdulia Alejos Abad

Sebastián Blanco

Theses

PHD STUDENT	THESIS TITLE	DIRECTORS
Obdulia Alejos Abad	Application to clinical practice of non-invasive prenatal determination of the fetal RHD genotype during the first trimester of pregnancy in RhD negative pregnant women	Núria Nogués Gálvez, Juan Parra Roca
Sebastián Blanco	Genetic characterization of platelets: Contribution to clinical practice and Transfusion Medicine in Córdoba	Núria Nogués Gálvez, Sandra Verónica Gallego

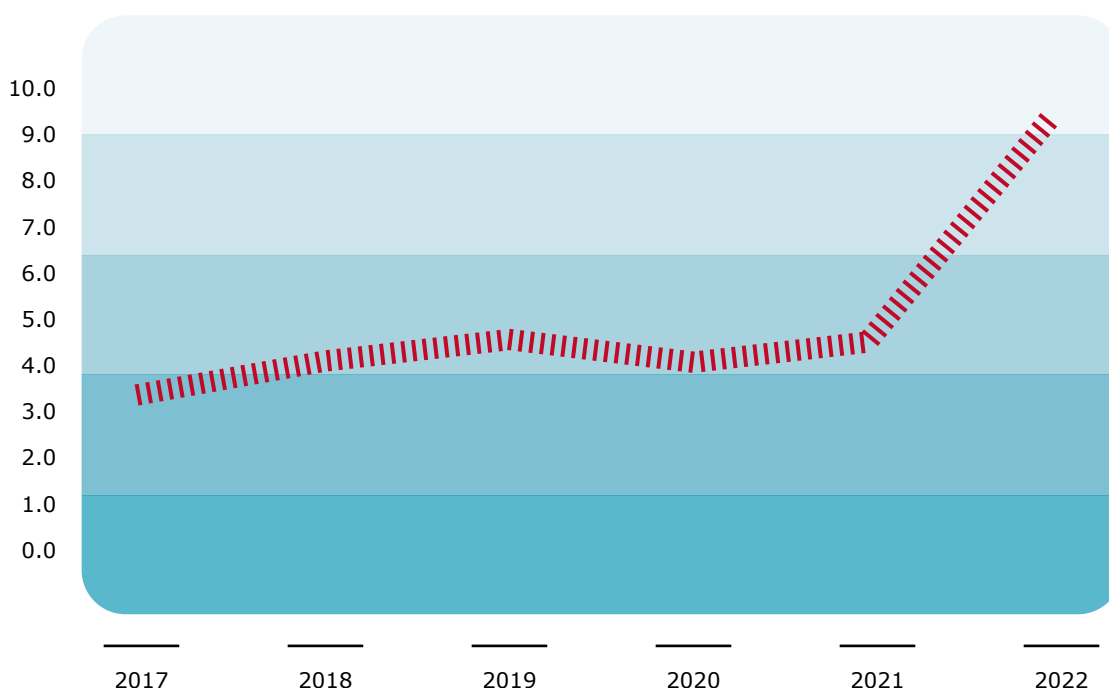
1.5.6. Publications

There were 54 publications by BST researchers in scientific journals in 2022, with an impact factor of 488. The average impact factor was 9. A 51% of the articles were published in first quartile journals.

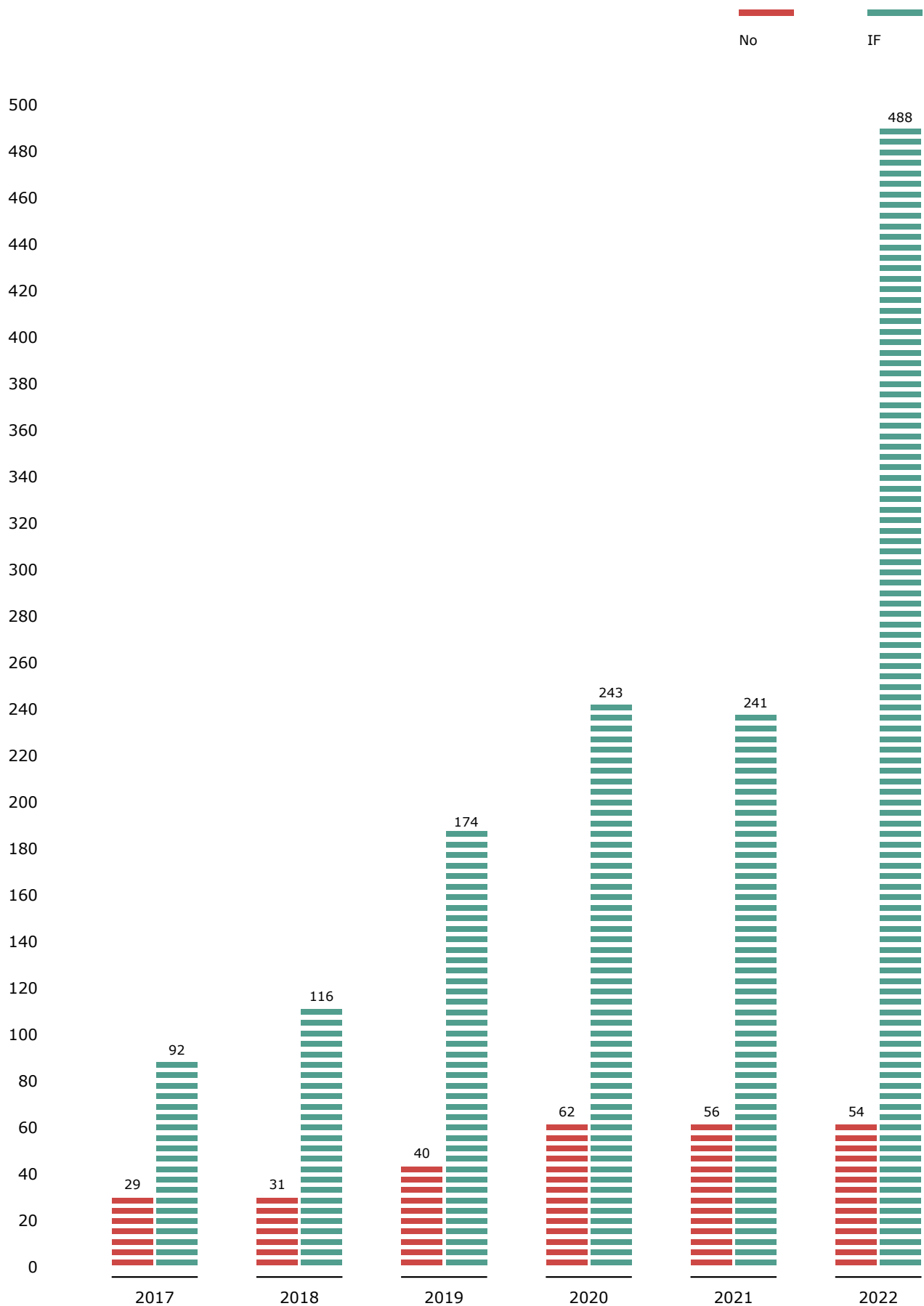
The 2021 *Journal Citation Reports* (JCR) were used to calculate the 2022 impact factor. Original articles, reviews, and editorials were included in the calculation.

Medium Impact Factor

Evolution of the BST's scientific production

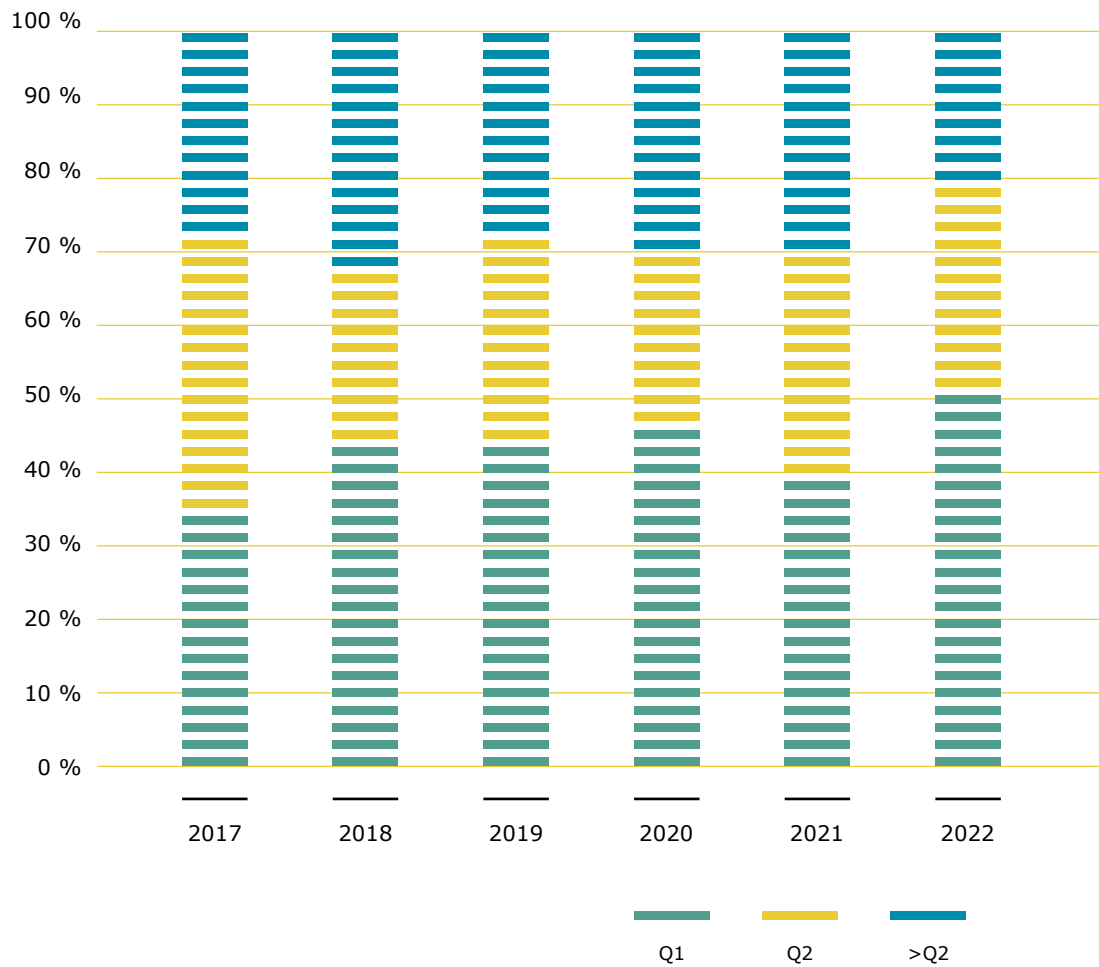


BST scientific output since 2017

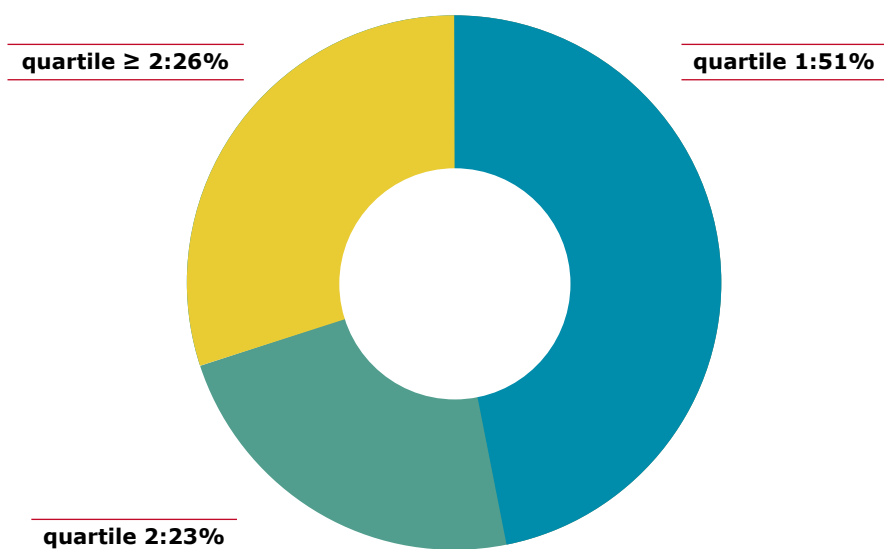


1.5.6. Publications

Classification of publications



2022 BST publications by quartiles



1.5.7. Patents and protection of industrial and intellectual property

The BST has one patent granted in Spain, one in the United States, and two granted by the European Patent Office and validated in several European countries.

1.6. Innovation

One of the objectives of this report is to highlight BST professionals' innovative capacity to create new products and services as a result of internal R&D.

During 2022, we have developed the following new innovative products and services:

The Histocompatibility and Immunogenetics Laboratory:

- Typing of HLA class I and class II genes using third generation sequencing.
- Validation of a new technique based on the characterization of the β chain of the T lymphocyte receptor (TCR) by means of next generation sequencing (NGS).
- Development of a second technique for the characterization of the B lymphocyte receptor (BCR) heavy chain using NGS.

The Cell Therapy Service:

- Development of an in-house bone marrow collection kit.
- Development of a technology, with the potential to be patentable, to facilitate and optimize the scaling of iPSC differentiation processes to lymphoid cells.

The Tissue Bank:

- Development of an adapted pericardium decellularization protocol and its preservation at room temperature.
- Validation of the preservation at room temperature of particulate grafts and small bone fragments.

The Transfusion Safety Laboratory:

- Implementation of several technological innovations applied to the screening of blood, plasma and platelet donations: a new multiplex molecular screening reagent that allows individual analysis of donations in a single reaction for hepatitis C, hepatitis B, hepatitis E and HIV-1/2 viruses.
- Implementation of selective malaria screening in risk donors with the dual goal of improving safety and minimizing donor loss.

The Laboratory of Congenital Coagulopathies – Genomic Platform:

- Extension of the diagnostic service by next generation sequencing to antithrombin III deficits and plasminogen deficits.
- Application of whole exome sequencing for the study of thrombopathies and connective tissue deficits.

BST-Analytics has been consolidated in the data science innovation framework of the BST and aims to develop and implement advanced information analysis tools, such as Artificial Intelligence algorithms. This initiative has been developed over the last three years as part of a pilot project financed with BST's own funds. The application of the analysis strategies developed on the donation data collected at BST has allowed to develop a mathematical model able to predicting donor's response to a donation call, leading to remarkable improvement in call efficiency. Currently, this system is implemented in the BST production chain and, for more than six months, it has been used in the weekly donation call for three Catalan hospitals.

BST research activity

2.1. Haemotherapy programme

Research in the haemotherapy programme aims to foster knowledge about the practice of transfusion medicine and related technologies.

Researchers in this programme are currently studying the basic biology and clinical implications of a wide range of problems regarding transfusions, immune responses to transfused blood, and underlying mechanisms, as well as practices related to the processing, storage and safety of blood.

The programme also focuses on research and development of diagnostic and decision-making techniques and processes that make transfusions safer, more effective and more efficient.

This programme not only has the support of its core members but also the simultaneous involvement of the area's principal laboratories and territorial centres.



Director

Núria Nogués Gálvez

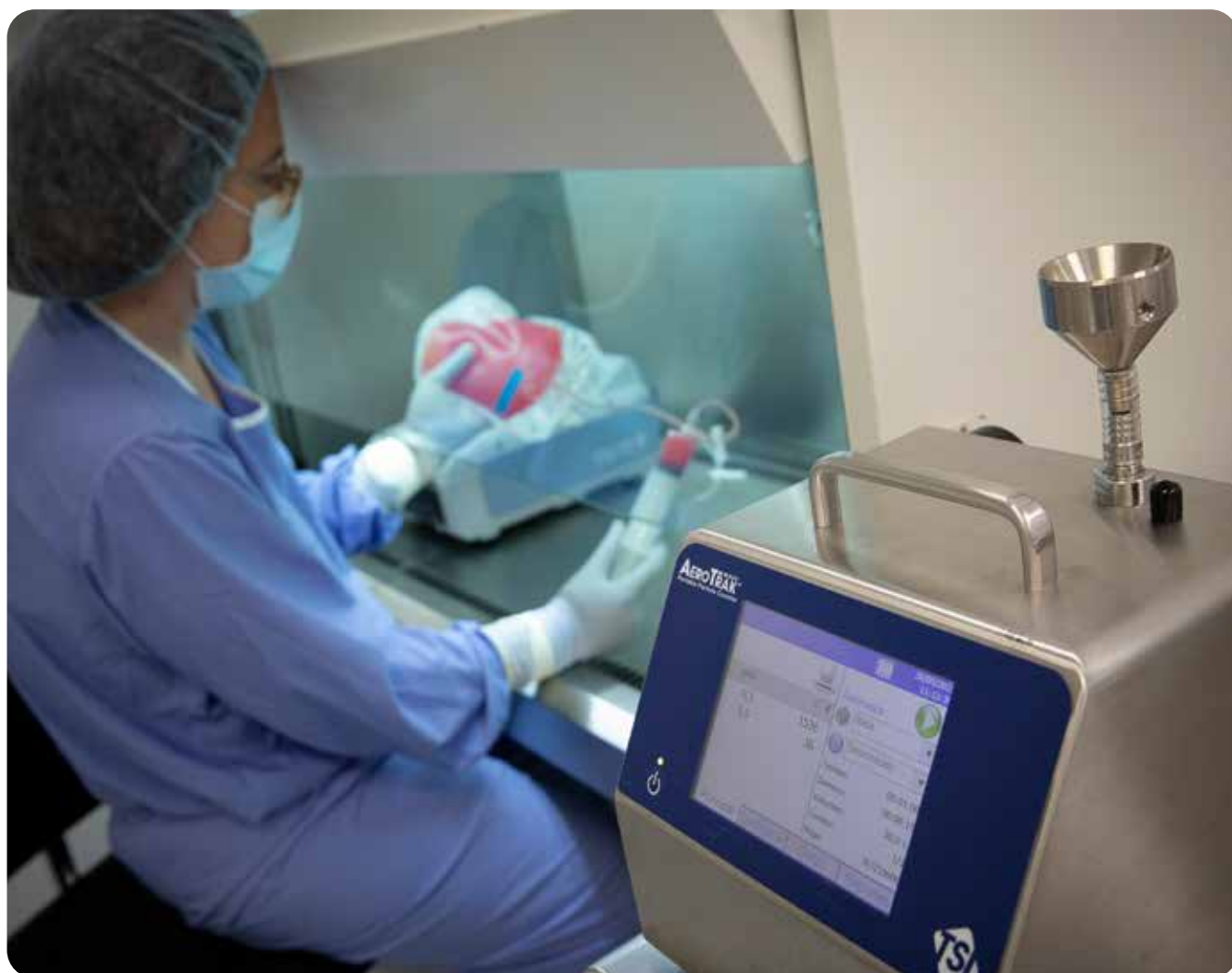
Support Staff

Natàlia Comes Fernandez
Sergio Huertas Torres
Lorena Ramírez Orihuela

Researchers

Perla Bandini
Nina Borràs Agustí
Neus Boto Ruiz
Laia Closa Gil
Irene Corrales Insa
Iris Garcia Martinez
Cecilia Gonzalez
Santesteban

Jordi Gual Obrador
María José Herrero Mata
Carlos Hobeich Naya
Laura Martín Fernández
Laia Miquel Serra
Francisco Vidal Pérez



Research projects

**Principal investigator:
Núria Nogués Gálvez**

ID-VITRORED: Obtaining in vitro red blood cells from iPSCs of donors with erythrocyte phenotypes selected and optimised by genomic editing, as an alternative to current red cell panels
Funding organisation: Spanish Investigation Agency
File: RTC-2017-6367-1
Duration: 2018 – 2022

**Principal investigator:
Maria José Herrero Mata**

HLA and other genes of interest for transplantation typing using nanopore technology: "Third Generation Sequencing"
Funding organisation: BST
File: I.2019.036
Duration: 2020 – 2022

**Principal investigator:
Núria Nogues Galvez**

Development and validation of a new tool for extensive typing of platelet apheresis donors with NGS technology
Funding organisation: BST
File: I.2021.030
Duration: 2021 – 2022

**Principal investigator:
Francisco Vidal Pérez**

Addressing inherited haemorrhagic disorders of complex aetiology through the application of a common exome sequencing strategy
Funding organisation: Carlos III Institute of Health
File: PI18/01492
Duration: 2019 – 2022

**Principal investigator:
Antoni Masi Roig**

Implementation of massive data analysis and exploitation tools. Application to the predictive study based on retrospective data from BST donation campaigns
Funding organisation: BST
File: I.2019.040
Duration: 2020 – 2022

**Principal investigator:
Elena Gómez Massa**

Application of NGS in monitoring of post-hematopoietic progenitor transplantation: detection of HLA genomic loss in the context of baseline disease relapse
Funding organisation: BST
File: I.2021.032
Duration: 2021 – 2022

**Principal investigator:
Francisco Vidal Perez**

Integration of genomic sequencing in SARS-CoV-2 surveillance
Funding organisation: European Commission
File: ECDC/HERA/2021/024 ECD.12241
Duration: 2022

**Principal investigator:
Laia Miquel Serra**

Generation of a panel of immortalised erythroid progenitor cell lines from selected blood donors as a sustainable source of cultured red cells
Funding organisation: BST
File: I.2021.028
Duration: 2021 – 2022

Collaboration projects

Principal investigator:
Anna Bigas Salvans (IMIM), Núria Nogués Gálvez (BST)

HEMO-GAS: Recreating the embryonic niche for hematopoietic stem cell production and derivatives in human gastruloids
Funding organisation: Spanish Investigation Agency
File: PLEC2021-007518
Duration: 2021 - 2024

Principal investigator:
David Valcárcel Ferreiras (Hospital Universitari Vall d'Hebron), Rafael Parra Lopez (BST)

A randomised, double-blind, multi-centre study comparing magrolimab in combination with azacitidine versus azacitidine plus placebo in treatment-naïve patients with higher risk myelodysplastic syndrome
Funding organisation: Gilead Sciences Inc.
File: 2020-004287-26
Duration: 2021 - 2022

Principal investigator:
Marc Oliva Bernal (Hospital Universitari de Bellvitge), Isabel Gonzalez Medina (BST)

A phase II study of ALX148 in combination with pembrolizumab in patients with advanced head and neck squamous cell carcinoma (ASPEN-03)
Funding organisation: ALX Oncology Inc.
File: 2020-004093- 21
Duration: 2021 - 2023

Principal investigator:
Marc Oliva Bernal (Hospital Universitari de Bellvitge), Isabel Gonzalez Medina (BST)

A phase II study of ALX148 in combination with pembrolizumab and chemotherapy in patients with advanced head and neck squamous cell carcinoma (ASPEN-04)
Funding organisation: ALX Oncology Inc.
File: 2020-004662-19
Duration: 2021 - 2023

Publications

Contreras-Barbeta E, Millan A, Rello J.

Convalescent plasma for SARS-CoV-2 infection: win or learn. EUR RESPIR J 2022 Feb 10;59(2):2102076. doi: 10.1183/13993003.02076-2021. PMID: 34531275; PMCID: PMC8462013. IF 33.809. Q1

Sanz C, Nomdedeu M, Pereira A, Sauleda S, Alonso R, Bes M, Brillembourg H, García-Vidal C, Millan A, Martínez-Llonch N, Píron M, Puerta-Alcalde P, Puig L, Rico V, Soriano A. Efficacy of early transfusion of convalescent plasma with high-titer SARS-CoV-2 neutralizing antibodies in hospitalized patients with

COVID-19. TRANSFUSION 2022 Mar 26. doi: 10.1111/trf.16863. PMID: 35338710. IF 3.337. Q3

Corrales I. New approaches to the genetic study of bleeding diathesis in our center: from sanger to next-generation sequencing. BLOOD COAGUL FIBRINOLYSIS 2022 Jan 1;33(Suppl 1):S19-S21. doi: 10.1097/MBC.0000000000001107. PMID: 35088770. IF 1.061. Q4

Alemany A, Millat-Martinez P, Corbacho-Monné M, Malchair P, Ouchi D, Ruiz-Comellas A, Ramírez-Morros A, Rodríguez Codina J, Amado Simon R, Videla S, Costes G, Capdevila-

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2.2. Cell therapy programme

The aim is for cell therapy at the BST to be a platform for knowledge and cell production for the Catalan healthcare system in order to provide the appropriate response to the needs of patients and the doctors who treat them.

The BST wants to facilitate the introduction of new advanced therapies in the health system, making the BST clean rooms available to research clinicians who need to perform concept tests.

Moreover, the BST is also interested in scaling products and taking on the challenge of bioreactor production in the development of clinical trials jointly with the Spanish Agency of Medicines and Medical Devices (AEMPS) and other entities.

Along with the above, the cell and advanced therapy service research focusses on the development of new products and services in the areas of immunotherapy and regenerative medicine.

Director

Sergi Querol Giner

Researchers

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Raquel Bermudo Gascón
Raquel Cabrera Perez

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Alba Lopez Fernandez
Ruth Mora Buch
Sara Morini

Luciano Rodríguez Gómez
Francesc Rudilla Salvador
Dinara Samarkanova
Maria Tomas Marin
Joaquim Vives Armengol



Research projects

Projects with a PI or CO-PI from the BST

Principal investigator:
Sergi Querol Giner

OSCAR-iNK: Off-the-Shelf iPSC-derived next generation CAR-NK cells for solid tumor allogenic immunotherapy
Funding organisation: Spanish Investigation Agency
File: CPP2021-008350
Duration: 2022 – 2025

Principal investigator:
Sergi Querol Giner

iPS-PANIA: Allogeneic iPSCs from homozygous umbilical cord blood units for high-prevalence haplotypes
Funding organisation: Spanish Investigation Agency
File: RTC-2017-6000-1
Duration: 2018 – 2022

Principal investigator:
Sergi Querol Giner

T-CELBANC: Creation of a national bank of specific T-lymphocytes for immediate use in opportunistic post-transplant infections
Funding organisation: Spanish Investigation Agency
File: RTC-2017-6368-1
Duration: 2018 – 2022

Principal investigator:
Joaquim Vives Armengol

Translation of an allogenic tissue engineering product with mesenchymal stem cells from Wharton's jelly for the treatment of osteonecrosis in paediatric oncology patients
Funding organisation: Carlos III Institute of Health
File: PI19/01788
Duration: 2020 – 2022

Principal investigator:
Belen Álvarez Palomo

UNiKAR: Universal cord blood iPSC-derived CAR-NK cells for an 'off-the-shelf' immunotherapy for cancer
Funding organisation: Carlos III Institute of Health
File: PI21/00796
Duration: 2022 – 2024

Principal investigator:
Joaquim Vives Armengol

Fibrin Sealant Grifols as scaffold in advanced therapies. 3D printing scaffolds for advanced trauma applications. In vivo study
Funding organisation: Instituto Grifols, SA
File: I.2016.035
Duration: 2017 – 2023

Principal investigator:
Sergi Querol Giner

Cellular immunological response to SARS-CoV-2. Decisions on the immunisation of T-cells and their use in potential therapy
Funding organisation: Cellnex Telecom, S.A.
File: I.2020.038
Duration: 2020 – 2023

Principal investigator:
Ana Belén Álvarez Palomo

Universal cord blood iPSC-derived CAR-NK cells for an 'off-the-shelf' immunotherapy for cancer (UNiKAR)
Funding organisation: BST
File: I.2021.027
Duration: 2021 – 2023

Principal investigator:
Sergi Querol Giner

Validation of red blood cells from umbilical cord blood for transfusion in extremely preterm infants
Funding organisation: BST
File: I.2021.033
Duration: 2021 – 2022

Principal investigator:
Joaquim Vives Armengol

Establishment of methods for the production and characterisation of Wharton's jelly mesenchymal stem cells with specific haplotypes
Funding organisation: BST
File: I.2021.034
Duration: 2021 – 2022

Principal investigator:
Ruth Coll Bonet

Phase I/II, randomised, double-blind, parallel, 2-arm, placebo-controlled clinical trial to evaluate the safety and efficacy of intrathecal administration of Wharton's jelly mesenchymal stem cells in the treatment of chronic traumatic incomplete cervical spinal cord injury
Funding organisation: BST
File: 2021-000346-18
Duration: 2021 – 2023

Collaboration projects

Principal investigator:
Antoni Bayés Genís (Hospital Germans Trias i Pujol), Sergi Querol Giner (BST)

PERISCOPE: PERIcardial matrix with mesenchymal Stem Cells fOr the treatment of PatiEnts with infarcted myocardial tissue
Funding organisation: Health Department of Catalonia
File: 2018-001964-49
Duration: 2019 - 2022

Principal investigator:
José María Moraleda Jiménez (Instituto Murciano de Investigación Biosanitaria Virgen de la Arrixaca), Joaquim Vives Armengol (BST)

RICORS TERA.V. Technology and therapeutic developments: innovation, transfer to the health system and education
Funding organisation: Carlos III Institute of Health
File: RD21/0017/0022
Duration: 2022 -2024

Principal investigator:
Claudia Valverde Morales (Hospital Universitari Vall d'Hebron), Sergi Querol Giner (BST)

A phase 2 single-arm, open-label clinical trial of ADP-A2M4 SPEAR™ T-cells in subjects with advanced synovial sarcoma or myxoid/round cell liposarcoma
Funding organisation: Adaptimmune Therapeutics PLC
File: 2019-000589-39
Duration: 2020 - 2022

Principal investigator:
Susana Rives Sola (Hospital Sant Joan de Déu), Enric Garcia Rey (BST)

A phase Ib/II, multi-centre, open-label, single-arm, multi-cohort study to evaluate the safety and efficacy of JCAR017 in paediatric patients with acute B-cell lymphoblastic leukaemia and relapsed/refractory B-cell non-Hodgkin's lymphoma
Funding organisation: Celgene Corporation
File: 2018-001246-34
Duration: 2018 - 2021

Principal investigator:
Juan Martin Liberal (ICO, Hospital Duran i Reynals), Sergi Querol Giner (BST)

A phase II, multi-centre trial with tumour-infiltrating T-lymphocytes (LN-144 or LN-145) in patients with solid tumours
Funding organisation: Lion Biotechnologies, Inc.
File: 2018-001608-12
Duration: 2019 - 2021

Principal investigator:
Pere Barba Suñol (Hospital Universitari Vall d'Hebron), Sergi Querol Giner (BST)

Phase I, open-label, multi-centre, dose escalation study of YTB323 in adult patients with CLL/SLL and DLBCL
Funding organisation: Novartis Pharma AG
File: 2018-004336-30
Duration: 2020 - 2022

Principal investigator:
Julio Delgado González (Hospital Clínic), Sergi Querol Giner (BST)

CART19-BE-02: Phase II clinical trial on the use of ARI-0001cells in patients with CD19+ relapse/refractory acute lymphoid leukaemia
Funding organisation: Carlos III Institute of Health
File: PIC18/00012
Duration: 2019 - 2022

Principal investigator:
Nerea Maiz Elizaran (Hospital Universitari Vall d'Hebron), Margarida Codinach Creus (BST)

Tissue engineering for the improvement of the surgical technique for the fetoscopic repair of spinal neural tube defects in sheep fetuses
Funding organisation: Carlos III Institute of Health
File: PI20/00421
Duration: 2021 - 2023

Principal investigator:
Elena Garralda Cabanas (Hospital Universitari Vall d'Hebron), Sergi Querol Giner (BST)

Next-generation TIL therapy targeting neoantigens for immune checkpoint blockade-resistant tumours
Funding organisation: Carlos III Institute of Health
File: ICI/20/00076
Duration: 2021 - 2024

**Principal investigator:
David Valcárcel Ferreira
(Hospital Universitari
Vall d'Hebron), Sergi
Querol Giner (BST)**

Efficacy and Safety of Autologous, Mobilized, Unexpanded CD133+ Cells to Treat Patients With Asherman's Syndrome: A Prospective, Multicenter, Phase I/II Clinical Trial
Funding organisation: Igenomix
File: 2016-003975-23
Duration: 2018 – 2023

**Principal investigator:
Pere Barba Suñol
(Hospital Universitari Vall
d'Hebron), Sergi Querol
Giner (BST)**

TRACE: Treatment of chemorefractory viral infections after allogeneic stem cell transplantation with multispecific T cells against CMV, EBV, and Adv: a phase III, prospective, multicenter clinical trial
Funding organisation: Ludwing Maximilians Munich University
File: 2018-000853-29
Duration: 2021 -2023

**Principal investigator:
Antoni Bayés Genís
(Hospital Germans Trias
i Pujol), Joaquim Vives
Armengol (BST)**

Modulation of inflammation by extracellular vesicles in STEMI-derived cardiogenic shock: EV4MI Trial
Funding organisation: Carlos III Institute of Health
File: ICI20/00135
Duration: 2021 – 2024

**Principal investigator:
Juan Martín Liberal
(Catalan Institute
of Oncology), Isabel
González Medina (BST)**

Prospective collection of donor tissue and blood or leukapheresis product from patients with solid tumours to enable development of methods for the manufacturing of clonal neoantigen T-cell products
Funding organisation: Achilles Therapeutics Limited
File: I.2021.019
Duration: 2021 - 2023

**Principal investigator:
Gloria Iacoboni (Hospital
Universitari Vall
d'Hebron), Sergi Querol
Giner (BST)**

A phase 2 multi-centre Study evaluating the efficacy of KTE-X19 in subjects with relapsed/refractory mantle cell lymphoma
Funding organisation: Kite Pharma, Inc
File: 2015-005008-27
Duration: 2021 - 2022

**Principal investigator:
Pere Barba Suñol
(Hospital Universitari Vall
d'Hebron), Sergi Querol
Giner (BST)**

An open-label, multi-centre, phase Ib/II study evaluating the safety and efficacy of AUTO1, a CAR T-cell treatment targeting CD19, in adult patients with relapsed or refractory B-cell acute lymphoblastic leukaemia. Protocol Number: AUTO1-AL1
Funding organisation: Autolus Therapeutics Ltd
File: 2019-001937-16
Duration: 2021 - 2022

**Principal investigator:
Pere Barba Suñol
(Hospital Universitari Vall
d'Hebron), Sergi Querol
Giner (BST)**

An open-label, single-arm, multicohort, phase II study to assess the efficacy and safety of tabelecleucel in subjects with Epstein-Barr virus-associated diseases
Funding organisation: Atara Biotherapeutics, Inc.
File: 2020-000177-25
Duration: 2021 - 2022

**Principal investigator:
Nayana Joshi Jubert
(Hospital Universitari Vall
d'Hebron), Joaquim Vives
Armengol (BST)**

Pre-clinical study of a tissue engineering product with Wharton's jelly mesenchymal cells for the treatment of focal lesions of the articular cartilage of the knee
Funding organisation: Spanish Knee Society
File: I.2021.068
Duration: 2021 – 2022

**Principal investigator:
Joan Vidal Samsó
(Guttmann Institute),
Ruth Coll Bonet (BST)**

A safety, randomized, double-blind, two therapeutic doses and placebo-controlled clinical trial for the treatment of incomplete cervical spinal cord injury with multiple intrathecally infusions of Wharton jelly mesenchymal stromal cells
Funding organisation: Carlos III Institute of Health
File: PI19/01680
Duration: 2020 – 2022

**Principal investigator:
Elena Garralda Cabanas
(Hospital Universitari
Vall d'Hebron), Sergi
Querol Giner (BST)**

A phase 1/2, first-in-Human, open-label, accelerated titration, two-part clinical trial of TK-8001 (TCR1367-transduced autologous CD8+ T cells) in subjects with HLA-A*02:01 genotype and advanced-stage, MAGE-A1+ solid tumors in non-curable state that have received a minimum of two lines of approved systemic therapy

Funding organisation:

T-KNIFE GMBH

File: 2021-004158-49

Duration: 2022 – 2023

**Principal investigator:
Cristina Saura Manich
(Hospital Universitari
Vall d'Hebron), Sergi
Querol Giner (BST)**

Treatment of advanced or metastatic triple-negative breast cancer with adoptive therapy of PD1+ tumor-infiltrating lymphocytes

Funding organisation: Clínic Foundation for Biomedical Research

File: 2020-003638-19

Duration: 2022 – 2023

**Principal investigator:
Cristina Diaz Heredia
(Hospital Universitari
Vall d'Hebron), Sergi
Querol Giner (BST)**

Phase 3, Randomized, Double-Blind, Placebo-Controlled Trial, with Cross-Over, of Posoleucel (ALVR105) for the Treatment of Adenovirus Infection in Pediatric and Adult Participants Receiving Standard of Care Following Allogeneic Hematopoietic Cell Transplantation

Funding organisation:

AlloVir

File: 2021-003450-22

Duration: 2022 - 2023

**Principal investigator:
Anna Sureda Balari
(Catalan Institute of
Oncology), Sergi Querol
Giner (BST)**

A pivotal Phase II randomised, multi-centre, open-label study to evaluate the efficacy and safety of MB-CART2019.1 compared to standard of care therapy in participants with relapsed/refractory diffuse large B-cell lymphoma, who are not eligible for high-dose chemotherapy and autologous stem cell transplantation

Funding organisation:

Miltenyi Biomedicine GmbH

File: 2020-003908-14

Duration: 2022 - 2023

**Principal investigator:
Elena Garralda Cabanas
(Hospital Universitari
Vall d'Hebron), Sergi
Querol Giner (BST)**

A phase 1 dose escalation study to assess safety and efficacy of ADP-A2M4CD8 as monotherapy or in combination with nivolumab in HLA-A2+ subjects with MAGE-A4 positive tumors

Funding organisation:
Adaptimmune Therapeutics PLC

File: 2019-001965-34

Duration: 2022 - 2023

Publications

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- Vives J**, **Sòria MG**, McGrath E, Magri M. The Quality Management Ecosystem in Cell Therapy in Catalonia (Spain): An Opportunity for Integrating Standards and Streamlining Quality Compliance. *CELLS* 2022 Jul 5;11(13):2112. doi: 10.3390/cells11132112. PMID: 35805196; PMCID: PMC9265754. IF 7.666. Q2
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- Fernandez-Sojo J**, **Cid J**, **Azqueta C**, **Valdivia E**, **Martorell L**, **Codinach M**, Marsal J, Mussetti A, Esquirol A, Trabazo M, Benitez MI, Ferra C, Fox ML, **Linares M**, **Alonso E**, **García-Rey E**, **García-Muñoz N**, **Medina L**, **Castillo-Flores N**, Vall-Llovera F, Garcia A, **Pinacho A**, Talarn C, **Arroba JG**, Coll R, **Santos M**, Valero O, Carreras E, Lozano M, Querol S. Post thawing viable CD34+ Cells dose is a better predictor of clinical outcome in lymphoma patients undergoing autologous stem cell transplantation. *BONE MARROW TRANSPLANT* 2022 May 25. doi: 10.1038/s41409-022-01722-6. PMID: 35614316. IF 5.176. Q2
- Fernandez-Sojo J**, Horton R, **Cid J**, **Azqueta C**, **García-Buendia A**, **Valdivia E**, **Martorell L**, **Rubio-Lopez N**, **Codinach M**, **Aran G**, Marsal J, Mussetti A, Martino R, Diaz-de-Heredia C, Ferra C, Valcarcel D, **Linares M**, **Ancochea A**, **García-Rey E**, **García-Muñoz N**, **Medina L**, Carreras E, Villa J, Lozano M, Gibson D, **Querol S**. Leukocytapheresis variables and transit time for allogeneic cryopreserved hpc: better safe than sorry. *BONE MARROW TRANSPLANT* 2022 Jul 8:1-8. doi: 10.1038/s41409-022-01750-2. PMID: 35804055; PMCID: PMC9264299. IF 5.176. Q2
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- Ortiz-Maldonado V, Rives S, Español-Rego M, Alonso-Saladrigues A, Montoro M, Magnano L, Giné E, Pascal M, Díaz-Beyá M, **Castella M**, Català A, Faura A, Rodríguez-Lobato LG, Oliver-Caldes A, Martínez-Roca A, Rovira M, González-Navarro EA, Ortega JR, Cid J, Lozano M, **García-Rey E**, Fernández S, Castro P, Jordan I, Villamor N, Aymerich M, Torredadell M, Deyà À, Fernández de Larrea C, Benitez-Ribas D, Trias E, Varea S, Calvo G, Esteve J, Urbano-Ispizua A, Juan M, Delgado J. Factors associated with the clinical outcome of patients with relapsed/refractory CD19+ acute lymphoblastic leukemia treated with ARI-0001 CART19-cell therapy. *J IMMUNOTHER CANCER* 2021 Dec;9(12):e003644. doi: 10.1136/jitc-2021-003644. PMID: 34907029; PMCID: PMC8671976. IF 12.487. Q1
- Monguió-Tortajada M, **Prat-Vidal C**, Martínez-Falguera D, Teis A, Soler-Botija C, Courageux Y, Munizaga-Larroudé M, Moron-Font M, Bayes-Genis A, Borràs FE, Roura S, Gálvez-Montón C. Acellular cardiac scaffolds enriched with MSC-derived extracellular vesicles limit ventricular remodelling and exert local and systemic immunomodulation in

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- Romecín PA, Vinyoles M, López-Millán B, de la Guardia RD, Atucha NM, **Querol S**, Bueno C, Benitez R, Gonzalez-Rey E, Delgado M, Menéndez P. Robust In Vitro and In Vivo Immunosuppressive and Anti-inflammatory Properties of Inducible Caspase-9-mediated Apoptotic Mesenchymal Stromal/Stem Cell. STEM CELLS TRANSL MED 2022 Mar 3;11(1):88-96. doi: 10.1093/stcltm/szab007. PMID: 35641173; PMCID: PMC8895490. IF 7.655. Q1
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- Rebulla P, **Querol S**, Pupella S, Prati D, **Delgadillo J**, De Angelis V. Recycling Apparent Waste Into Biologicals: The Case of Umbilical Cord Blood in Italy and Spain. FRONT CELL DEV BIOL 2022 Jan 4;9:812038. doi: 10.3389/fcell.2021.812038. PMID: 35059402; PMCID: PMC8763965. IF 6.081. Q1
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2.3. Tissue Bank programme

The Tissue Bank programme is focused on translational research, as well as the development, optimisation and innovation of procedures and techniques aimed at improving the usefulness, quality and safety of human cells and tissues, for therapeutic or biosubstitutive purposes.

Researchers also have a coordinating role in the projects, analysing their viability and, when possible, compiling resources for their development through competitive public grants (Spain and the European Community) and from private entities and foundations and businesses in the industry.

Our research programme enhances self-sustainability and innovation based on collaboration with the business sector in coordination with leading translational research clinical groups in the national and international context.



Translational research is a tool for continuous improvement and focuses on responding to therapeutic indications through the use of effective and appropriate approaches and procedures.

The strategy of our RDI programme thus enhances the different lines of research regarded as strategic for the organisation, taking into account other aspects, such as the fact that our first priority is the patient. In addition, compliance with the ethical and regulatory framework as well as quality and excellence and a commitment to sustainability are fundamental pillars in the process.

Director

Patricia Lopez Chicón

Cristina Castells Sala

Oscar Fariñas Barbera

Laura López Puerto

Marisa Pérez Rodríguez

José Ignacio Rodríguez

Martínez

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Andres Savio Lopez

Jaime Tabera Fernandez

Anna Vilarrodona Serrat

Researchers

Elba Agustí Robira

Ana Rita Baptista Piteira



Research projects

Projects with a PI or CO-PI from the BST

Principal investigator:
Cristina Castells Sala
VASCRAFT: New human decellularized and re-endothelialized tissue-engineered VASCular gRAFT for coronary artery bypass grafting
Funding organisation: Spanish Investigation Agency
File: CPP2021-008438
Duration: 2022 – 2025

Principal investigator:
Anna Vilarrodona Serrat
EGALITE: European Group for Accreditation and Liaison of Blood-Tissues and Cells Establishments
Funding organisation: European Commission
File: 101056852
Duration: 2022 - 2024

Principal investigator:
Oscar Fariñas Barber and Pablo Gelber (Hospital de la Santa Creu i Sant Pau)
Fresh preservation of osteochondral allografts at 37°C
Funding organisation: Carlos III Institute of Health
File: PI18/01771
Duration: 2019 – 2022

Principal investigator:
Patricia Lopez Chicon
Optimisation of the conditions of products intended for tissue transplantation
Funding organisation: BST
File: I.2017.038
Duration: 2017 – 2022

Principal investigator:
Cristina Castells Sala
Development of a heart valve decellularisation method to be used in valve replacement surgeries
Funding organisation: BST
File: I.2018.027
Duration: 2018 – 2022

Principal investigator:
Cristina Castells Sala
Decellularised and re-endothelialised vascular graft for use in coronary bypass surgery
Funding organisation: BST
File: I.2019.030
Duration: 2020 – 2022

Principal investigator:
Marisa Perez Rodriguez
Rotator cuff repair with dermal matrix patch from the tissue bank
Funding organisation: BST
File: I.2019.038
Duration: 2020 – 2022

Principal investigator:
Anna Vilarrodona Serrat
Reduction of post-infarction lesion by bioimplants with reparative capabilities: biomimetic hydrogels and extracellular vesicles for cardiac regenerative medicine
Funding organisation: BST
File: I.2019.039
Duration: 2020 – 2022

Principal investigator:
Raquel Bermudo Gascón
Technological development and implementation of a computer system for digitising grafts and donor-recipient correlation for use in tissue banks
Funding organisation: BST
File: I.2021.026
Duration: 2021 – 2022

Collaboration projects

Principal investigator:
Francisco Fernandez Aviles (Hospital General Universitario Gregorio Marañón), Patricia Lopez Chicón (BST)
Safety and efficacy of the intracoronary administration of allogeneic heart stem cells in patients with ischemic heart failure with a high risk of sudden death
Funding organisation: Carlos III Institute of Health
File: PIC18/00024
Duration: 2019 – 2022

Publications

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2.4.

Biological safety programme

The Transfusion Safety Laboratory (LST in the Spanish acronym) aims to improve knowledge on pathophysiological, epidemiological and detection aspects of infectious agents that affect the safety of blood, cells, tissues and breast milk.

In this respect, we should highlight the activity carried out to improve knowledge of the presence of pathogens from other countries among the BST's reference population in Catalonia.

Studies in this direction are aimed at planning and establishing strategies to ensure the safety of blood products on the basis of a correct selection of blood donors and the use of diagnostic tests. It should be borne in mind that the BST is the only centre that distributes blood products in Catalonia and its direct responsibility is to maintain and promote research along these lines.

The LST comprises the Care Unit and the R&D Unit for transmissible agents. The R&D activity of the LST has two main lines:

- A.** Viral hepatitis (HBV, HCV and HEV) and HIV coinfection
- B.** Epidemiological research and development of new tools for the detection of emerging infectious agents (Chagas disease, HTLV-I/II, Chikungunya virus, malaria, XMRV, ZIKA)

Director

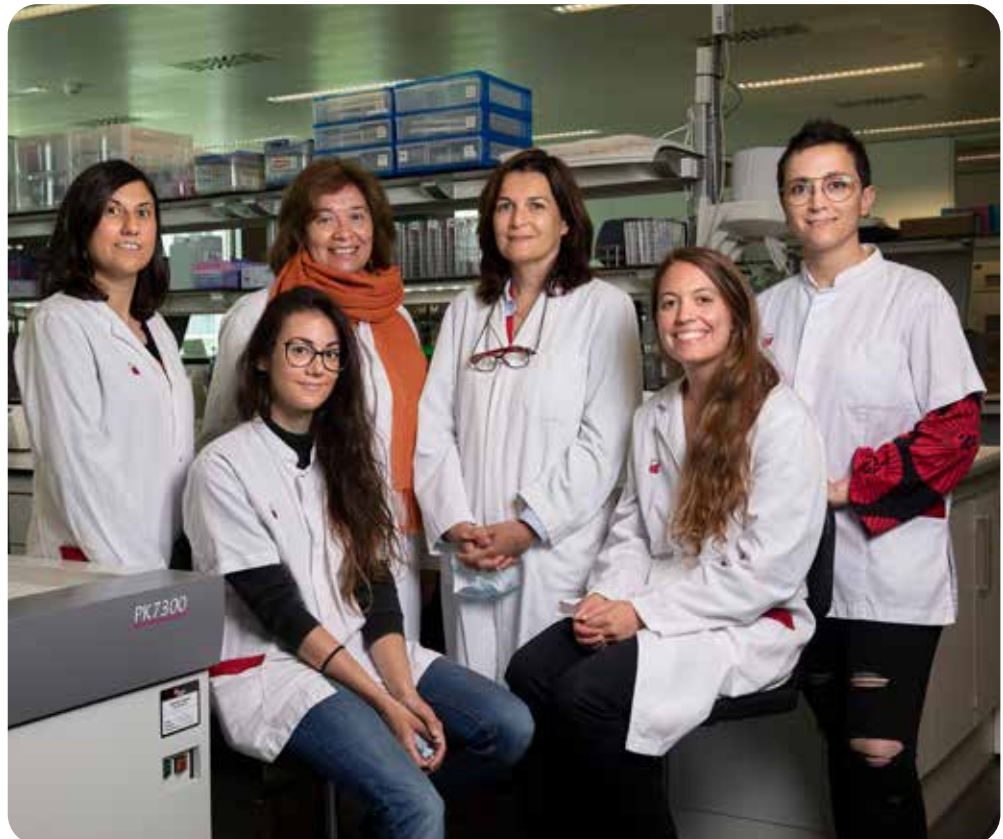
Sílvia Sauleda Oliveras

Researchers

Marta Bes Maijó
Meritxell Llorens Revull
Maria Piron

Support staff

Angeles Rico Blázquez



Research projects

Projects with a PI or CO-PI from the BST

Principal investigator: Maria Piron

Development of real-time PCR protocols (ZIKA, Dengue, Chikungunya, HTLV-I, HTLV-II, etc.) as supplementary screening or analysis tools for emerging infectious pathogens and a field study of emerging pathogens in high-risk travellers and immigrant donors
Funding organisation: BST
File: I.2016.037
Duration: 2009 – 2022

Principal investigator: Marta Bes Maijó

Prevalence of HIV pre-exposure prophylaxis and hepatitis A virus antibodies as surrogate markers of undisclosed high-risk sexual practices among blood donors in Catalonia
Funding organisation: BST
File: I.2019.031
Duration: 2020 – 2022

Principal investigator: Sílvia Sauleda Oliveras

Naturally- and vaccine-induced humoral immune response to SARS-CoV-2: A holistic approach from the Blood Bank
Funding organisation: BST
File: I.2021.029
Duration: 2021 – 2022

Collaboration projects

Principal investigator: Juan Ignacio Esteban Mur (Hospital Universitari Vall d'Hebron), Sílvia Sauleda Oliveras (BST)

Dynamic changes in HCV-specific immune response during and after DAAs treatment to unravel new approaches to prophylactic vaccine development
Funding organisation: Carlos III Institute of Health
File: PI19/00533
Duration: 2020 – 2022



Publications

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- Piron M, Salvador F, Caballero E, Sánchez-Montalvá A, Bes M, Casamitjana N, Puig L, Molina I, Sauleda S.** HTLV-1/2 Infection in Blood Donors from a Non-Endemic Area (Catalonia, Spain) between 2008 and 2017: A 10-Year Experience. *VIRUSES* 2022, 14, 1975. doi: 10.3390/v14091975. IF 5.818. Q2
- Piron M, Jané M, Ciruela P, Basile L, Martínez A, Puig L, Bes M, Sauleda S.** SARS-CoV-2 seroprevalence in blood donors before and after the first wave in Catalonia (Spain). *BLOOD TRANSFUS* 2022 Feb 4. doi: 10.2450/2022.0232-21. PMID: 35175189. IF 5.752. Q2
- Sauleda S, Palacios L, Brès V, Piñana M, Alonso-Hernandez L, Bes M, Piron M, Entrena E, Minguez-Micolau AM, Marimón JM, Gurrola A, Soria G, Puig L, Antón A, Pumarola T, Linnen JM.** Clinical evaluation of the Procleix SARS-CoV-2 assay, a sensitive, high-throughput test that runs on an automated system. *DIAGN MICROBIOL INFECT DIS* 2022 Jan;102(1):115560. doi: 10.1016/j.diagmicrobio.2021.115560. Epub 2021 Sep 25. PMID: 34688036; PMCID: PMC8464401. IF 2.983. Q3
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- Malik J, Klammer M, Rolny V, Chan HL, Piratvisuth T, Tanwandee T, Thongsawat S, Sukeepaisarnjaroen W, Esteban JI, **Bes M**, Köhler B, Swiatek-de Lange M. Comprehensive evaluation of microRNA as a biomarker for the diagnosis of hepatocellular carcinoma. *WORLD J GASTROENTEROL* 2022 Aug 7;28(29):3917-3933. doi: 10.3748/wjg.v28.i29.3917. PMID: 36157551; PMCID: PMC9367234. IF 5.374. Q2
- Roade L, Riveiro-Barciela M, Palom A, Rodríguez-Frías F, **Bes M**, Rando A, Salcedo MT, Casillas R, Vargas-Accarino E, Tabernero D, **Sauleda S**, Esteban R, Buti M. ACE Score Identifies HBeAg-negative Inactive Carriers at a Single-point Evaluation, Regardless of HBV Genotype. *J CLIN TRANSL HEPATOL* 2022 Dec 28;10(6):1068-1076. doi: 10.14218/JCTH.2022.00068. Epub 2022 Apr 24. PMID: 36381089; PMCID: PMC9634781. IF 5.065. Q2

2.5.

Blood, cell and tissue donation programme

This is a newly created programme in the SRP 2017-20.

It aims, among other things, to develop projects for the improvement of our knowledge of donors' behaviour and their affective and decision-making mechanisms in order to better adapt donations to therapeutic needs, while preserving the well-being and ethical and social values of donors.

The research focuses on a series of priorities, one of which is the study of ethical principles, promotion, donation behaviours and, above all, the protection, well-being and comfort of the donor.



3.

Core platforms

The central or core platforms are shared research resources that provide access to BST researchers and institutions with links to instruments, technologies and services, as well as expert consultations and collaborations.

The BST has fostered the consolidation of these platforms through the laboratories of the healthcare divisions, taking advantage of their technological capabilities and opening up their own research resources to general use.

3.1. Genomics platform

The Genomics Platform of the Banc de Sang i Teixits supports the adaptation of molecular diagnostic protocols to next generation sequencing (NGS) technology, as well as its application to different research and innovation projects. The extensive experience in the development of NGS applications is complemented by a solid support structure in equipment. Currently, the platform has two MiSeq and one Illumina NextSeq 500 equipment, which allow great scalability to address protocols ranging from the identification of point variants in one or a few genes to whole exome sequencing or transcriptome study. It also has Oxford Nanopore's MinION and MinIT third-generation sequencing (TGS) platforms, which enable ultra-long reads. The functions of the platform consist in the management and optimization of the use of NGS and TGS technology, in the technical support in the design and development of projects, in the execution and analysis of data for researchers who want to apply high-throughput genomic techniques to their work. In this sense, it is essential to support the projects from the beginning to determine the most suitable strategy that allows the achievement of the objectives. In addition to sequencing technology, the Platform has a specific molecular biology instrumentation infrastructure within the laboratory area (nucleic acid extractors, automatic dispensers, traditional SeqStudio genetic analyzers, Thermocyclers, Real-Time PCR, Luminex technology, Nanodrop, Qubit, etc.) that allows automation for the processing of large sample volumes simultaneously. It also has bioinformatics tools and specific analysis programs for the interpretation of the results, as well as data management systems to store the large volume of information generated by these technologies in an agile and secure manner.

Director

Irene Corrales Insa

Researchers

Nina Borrás Agustí

Natàlia Comes Fernandez

Carlos Hobeich Naya

Francisco Vidal Perez



3.2. Cell laboratory

Its functions include maintenance and provision of the necessary equipment to researchers working with cell cultures and characterisation (mainly with cytometry, microscopy and metabolism analysis), as well as the basic training needed for their correct use.

Moreover, the experience of the platform's professionals is used to support and offer added value to the research and assistance activities of BST researchers, including technical support in the design and execution of projects, data management and analysis.

In summary, the functions of the platform include: user training, organisation of the equipment use, supervision, maintenance and calibration/verification of the devices, the development and updating of standard working procedures, and support for users in the design and execution of tests with cells and technological surveillance, among others.

Director

Gloria Soria Guerrero

Researchers

Francisco Javier Algar
Gutierrez

Begoña Amill Camps
Mireia Lloret Sanchez
Fatima Shettiyar Brun
Sara López Molina
Nicole Somarribia

Hernández

Laura Galvez Saleta
Isabel Tarragó Canela
Ruth Forner Gómez
Margarita Blanco Garcia
Margarita Codinach Creus
Gemma Aran Canals
Silvia Torrents Zapata



3.3. Clinical development

The clinical development platform supports BST teams and their collaborators in the development of clinical trials conducted with the products their research generates as well as promoted by their public and private collaborators. It is also a channel of communication with regulatory agencies.

It is headed by
Ruth Coll Bonet

3.4. The Biobank

The BST Biobank provides the scientific community with the necessary biological material, in optimal conditions, to contribute to its research of excellence while guaranteeing the rights of donors.

It began its activity on 17 September 2010, with provisional authorisation, and obtained definitive administrative authorization on 12 April 2013.

It currently has a cross-cutting structure that manages the transfers of biological samples (blood components, plasma, serum, progenitors, tissues, etc.) between the BST's different departments and the researchers who request them.

The Biobank's scientific committee has 5 members:

Silvia Sauleda.

Head of the Transfusion Safety Laboratory (LST)

Anna Vilarrodona

Head of the Tissue Bank

Sergi Querol

Head of the Cell Therapy Service

Aurora Navarro

Notify project coordinator

Francisco Vidal

Head of the Congenital Coagulopathies Laboratory

Scientific management of the Biobank is led by Joaquim Delgadillo Duarte, Director of Strategic Planning of Advanced Therapies at the BST, and Pilar Monleón Martínez, coordinator, handles all the administrative processes related to sample transfer.

The BST supply area and its different territorial centres are responsible for the supply of samples to all BST services and departments.

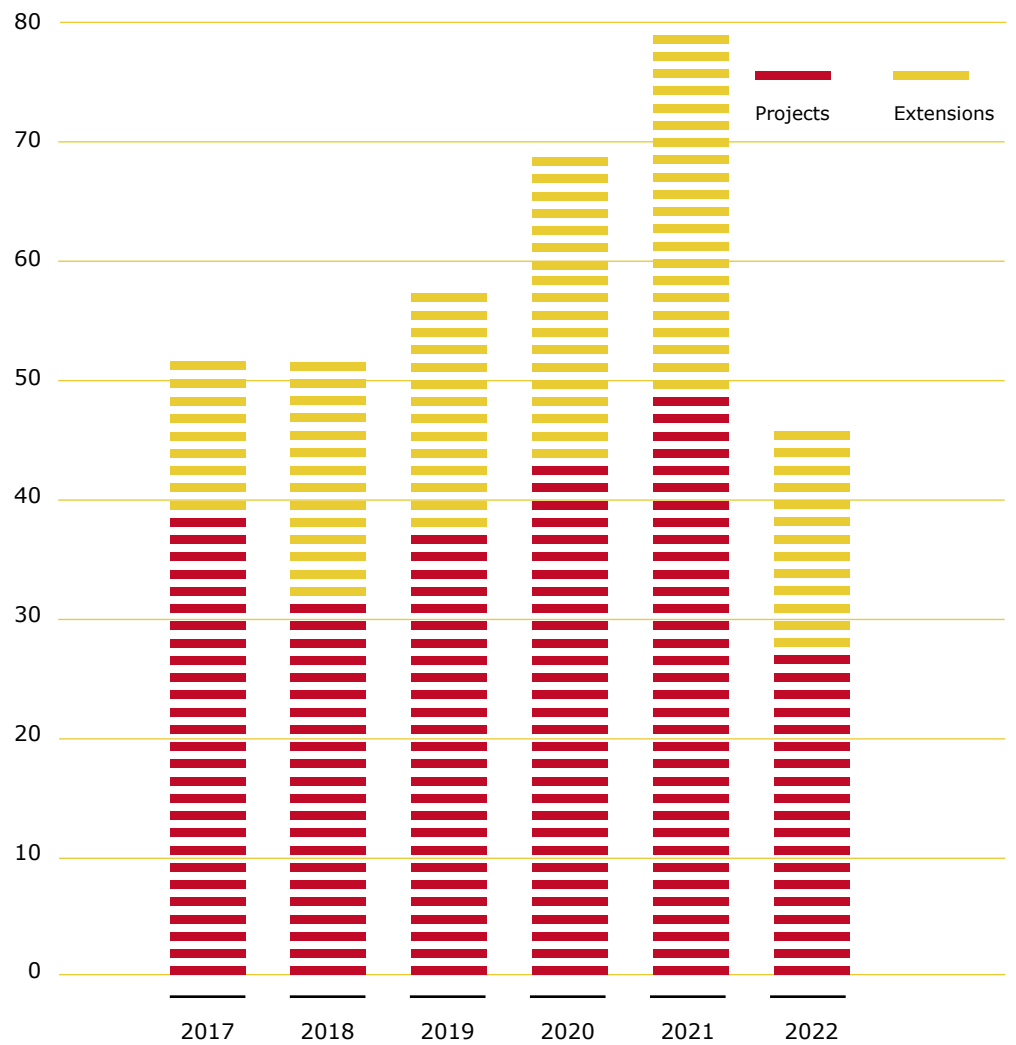
Pilar Monleon



Active projects

Twenty-eight new projects have been approved for sample assignment and another nineteen projects have had approval extended.

Here is a list of the number of projects and extensions since 2017:



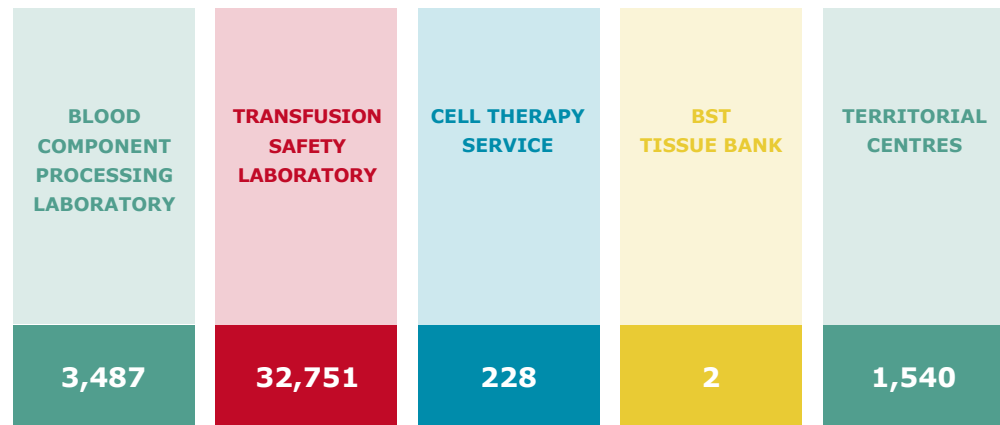
MoU

Agreements for the transfer of biological samples are regulated through memorandums of understanding (MoU) with research institutions, universities or companies in the health sector.

These come from the different BST services shown below, where the number of units delivered is also expressed.

The samples come from the different services of the BST

38,027
samples
were
supplied



Collaboration agreements

During 2022 six general agreements, 4 MTA's and 5 extensions of previous agreements have been signed with the following entities:

General agreements:

Spinreact SAU, IDIBGI, IBSAL, Grifols SA, Remab Therapeutics SL i Ona Therapeutics

MTA's:

Institut de Recerca Hospital Santa Creu i Sant Pau, UPF, Pfizer i IdiPAZ

Extensions:

FCRB, F Barcelonaβeta Brain Research Center, Draconis Pharma SL, IDIBELL, Acondicionamiento Tarrasense (Leitat Technological Center)

ECONOMIC ACTIVITY

During 2022 the Biobank has invoiced 310,072 €



4.

Education at the BST

The mission of the BST education area is to promote and collaborate in the training of Health and Life Sciences students and professionals, particularly in the field of transfusion medicine and cell and tissue therapy.

It develops its own teaching and training services and acts as a reference centre for professionals in the sector at a national and international level.

It also manages the MoUs and coordinates and plans residents' training and the training stays of external and internal professionals, as well as handling student internships in the BST's different departments. It is also responsible for the induction all these professionals and students when they arrive at our main centre's facilities.

The education area engages in different activities, which can be seen in detail in the special 2022 report, aimed at different profile groups:

4.1.

Students from other institutions

4.1.1. Schools and centres

This 2022 we signed specific agreements with the following schools and vocational training centres:

- Institut les Vinyes
- la Guineueta, Castellarnau,
- Narcís Monturiol
- Pedraforca, Provençana
- Forma't
- Obert de Catalunya
- Rambla Prim, Centre
- Educatiu Dolmen
- Escola Jesuïtes del Clot
- Santa Maria dels Apòstols
- Ilerna.

Twenty students joined us at the BST headquarters, the specialities being:

Clinical and Biomedical Laboratory	8
Pathological Anatomy and Cytodiagnosis	5
Cell Culture	1
Laboratory Operations	2
Clinic Electromedicine	1
Web application development (bioinformatics)	1
Administrative Management	1
Health Documentation and Management	1

Eighteen students joined the territorial centres, in the following specialities:

Clinical and Biomedical Laboratory	16
Nursing Assistant Care	1
Health Documentation and Management	1

In addition, we welcomed 8 secondary school students from the Sagrada Família, Arquitecte Manuel Raspall and La Salle Bonanova schools, four at the BST headquarters (in People and Values Department, Cell Therapy Service, Cell Laboratory and Tissue Bank) and four in the territorial centres, (BST-Sant Pau, Terrassa and Girona).

4.1.2. Universities

Seventeen undergraduate students have been tutored, 15 at the BST headquarters and 2 at BST Terrassa.

They came from the following universities:

- Universitat de Barcelona: Faculties of Pharmacy, Biomedical Sciences, Economics and Business (Statistics), Philology (Communication and Cultural Industries) and Public Security of Catalonia
- Universitat Autònoma de Barcelona: Faculties of Microbiology and Biology
- Universitat Pompeu Fabra: Faculty of Biology
- Universitat Politècnica de Catalunya: Faculty of Biomedical Engineering
- Universitat Blanquerna: Faculty of Pharmacy
- Institut Químic de Sarrià: Faculty of Biotechnology
- Universitat de Lleida: Faculty of Biotechnology
- Hospital Universitari Sant Joan de Reus: Faculty of Medicine

The graphs below show how the students are distributed among the different departments and territorial centres:



4.2.

Medical residents

BST is the reference centre for the training of resident doctors (MIR) in the specialty of Hematology and Haemotherapy.

In 2022, the BST headquarters trained 15 medical residents in the specialty of Hematology and Haemotherapy; they came from the following hospitals in Catalonia:

Hospital Vall d'Hebron	1
Hospital Germans Trias i Pujol	2
Hospital Bellvitge	3
Hospital Sant Pau	4
Hospital Joan XXIII	1
Hospital Clínic	1
Hospital Parc Taulí	1
Hospital Mútua Terrassa	2
TOTAL	15

Residents rotate through the following departments:

- Immunohematology Laboratory
- Histocompatibility and Immunogenetics Laboratory
- Congenital Coagulopathies
- Cell Therapy Service
- Cell Laboratory
- Blood Component Processing Laboratory
- Transfusion Safety Laboratory
- Quality and Communication Department

We have also trained three MIR's from the rest of Spain; they were coming from Hospital Universitario de Gran Canaria Dr. Negrín, Hospital Universitario Central de Asturias and Hospital Universitario de Canarias.

Residents from other specialties can also do a rotation at BST. In 2022, two immunology residents have rotated to the HLA and Immunohematology Lab and 7 to the territorial centres for the specialties of clinical analysis and internal medicine.

Residents are evaluated both at the territorial centres and at the headquarters with the rotation evaluation report provided by the Subdirector General for Professional Management of the Ministry of Health, Consumer Affairs and Social Welfare.

This report assesses the degree of compliance with the rotation objectives and evaluates the skills acquired on a scale of 1 to 10.

In October 2022, Jesús Fernández has replaced Eduard Muñiz as MIR coordinator due to his retirement.

4.3.

Academic training

More and more BST professionals (there are now 25) carry out teaching activities in the various universities of Catalonia: Universitat de Barcelona, Universitat de Girona, Universitat Rovira i Virgili, Universitat de Barcelona, Universitat Internacional de Catalunya and Universitat Ramon Llull.

We would also like to give a special mention to all BST staff, whoever they may be, for their work in tutoring and accompanying all the students who are trained in our facilities.

4.3.1. Chair in transfusion medicine and cell and tissue therapy (cmt3)

The Cmt3 has continued the same line of teaching activity with the Breastfeeding and Human Milk Donation program with 28 students enrolled.

Coordinated by Carlos González and Luis Ruiz, Vanessa Pleguezuelos and Marina Vilarmau, with the collaboration of the Universitat Autònoma de Barcelona and the Universitat de Manresa.

4.4.

Lifelong learning

During 2022, four professionals from different backgrounds completed a training stay: Banco de Tejidos del Instituto Portugués de Sangre y Trasplante, Hospital Gregorio Marañón de Madrid, Universidad Nacional de Rosario (Argentina), Universidad Clínica de Cirugía Ortopédica de la República de Macedonia and Hospital Germans Trias i Pujol.

With the following departments: Cell Therapy Service, Tissue Bank and, Immunohematology Laboratory.

The new haematologists hired by BST in the territorial centres also rotate through the different departments and laboratories of the headquarters in order to familiarize themselves with the procedures and techniques, for the effective fulfillment of their new tasks. In 2022, 6 professionals from BST-Girona, BST-Terrassa, BST-Manresa, BST-Badalona, BST Vall d'Hebron and BST-Bellvitge completed this training.

Coordinators

In charge of the on-line part



Carlos Gonzalez
Pediatric Specialist

He is the founder and president of ACPAM (Catalan Association for Breastfeeding) since 1991. From this association, he has directed and imparted teaching in more than 100 courses on breastfeeding for health professionals.

Author of the books: My child does not eat, Kiss me a lot, A gift for life or growing together.



Marina Vilarmau
Pedagogue, specialist in Training Projects in the Area of Health Sciences.

Master's degree in clinical simulation methodology (UVic-UCC). Master's degree in sexual difference studies (UB). With more than 10 years dedicated to the design and direction of training projects in the area of health and education sciences.



Luis Ruiz
Pediatric Specialist

Pediatrician. Trained in maternal and child health (MSc) University of London and Diploma in Senology at the University of Barcelona. Pediatrician in Primary Care at the CAP 17 de Setembre in El Prat de Llobregat and private consultation in Breastfeeding at the Quirón-Dexeus i Gavà Family Health Clinic. Former national coordinator of the IHAN and Emergency Pediatrician at the Children's Hospital of Barcelona.



Vanessa Pleguezuelos
Biologist specializing in Biosanitary

Head of the Human Milk Bank, Blood and Tissue Bank. Master's degree in scientific, medical and environmental communication. Master's degree in TAC training, Learning management and Innovation in Organizations. Certificate of Pedagogical Skills. Professor of breastfeeding courses at the Public Health Agency, the College of Nursing and the University of Barcelona.

5.

The BST Research and Education team

Apart from the people directly involved, a very large number of professionals from the different departments of the BST collaborate in the smooth running of research and education at our organisation. It is only fair to thank them for their contribution.

Specific mention should be made of the people who make up the Research and Education team:



BST Project Manager

Elisabet Tahull

Head of Clinical Development

Ruth Coll

Project manager

Raquel Gil

Educational programmes staff, Fundació Salut i Envel·liment UAB (Health and Ageing Foundation UAB)

Marina Vilarmau

Coordinator for educational projects, UAB

Remei Camps

Director, Fundació Salut i Envel·liment UAB

Antoni Salvà

Administrative assistant, Fundació Salut i Envel·liment UAB

Helena Garrigós







Some of the projects carried out at the BST during 2022 were funded by the call of RDi Projects in Public-Private Collaboration of the National Program to enhance the Scientific-Technic Research and its Transference, of the National Plan of Scientific, Technic and Innovation Research 2021-2023, within the framework of the Recovery, Transformation and Resilience Plan. Funded by:



The project "*HEMO-GAS. RECREATING THE EMBRYONIC NICHE FOR HEMATOPOIETIC STEM CELL PRODUCTION AND DERIVATIVES IN HUMAN GASTRULOIDS. PLEC2021-007518*", is funded by the Science and Innovation Ministry/State Research Agency (Digital Object Identifier 10.13039/501100011033) and by the European Union "NextGenerationEU"/PRTR. Project PLEC2021-007518 funded by:



The project "EGALITE. European Group for Accreditation and Liaison of Blood-Tissues and Cells Establishments is funded by the European Union.

