

# 2023

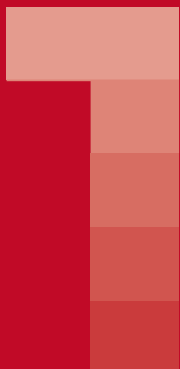
RESEARCH  
AND TEACHING  
REPORT BST



/Salut



BANC DE SANG  
I TEIXITS



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**CRYO-APRON**  
TEMPSHIELD, INC.

Scalpak  
SAFETY PRODUCTS



**Anna  
Millán  
Álvarez**  
CEO

## Foreword by the CEO

Research and investigation at the service of the country's biomedical ecosystem  
Over the course of the last year, we have continued to make progress in our mission to grow and deliver innovative knowledge that will transform into a future full of hope for many patients in Catalonia in the years ahead. This is the driving force behind our presentation of the 2023 Research Report, which summarises all the work related to research and investigation that we have carried out over the past year.

We have embarked on a new phase, guided by the road map outlined in the new Strategic Plan (2024-2027), which places us in a new context: the consolidation of our scientific journey and the assumption of a research leadership position rooted in our historical role as the Catalan public entity responsible for the collection, processing, storage, and supply of all substances of human origin (SoHO) in Catalonia.

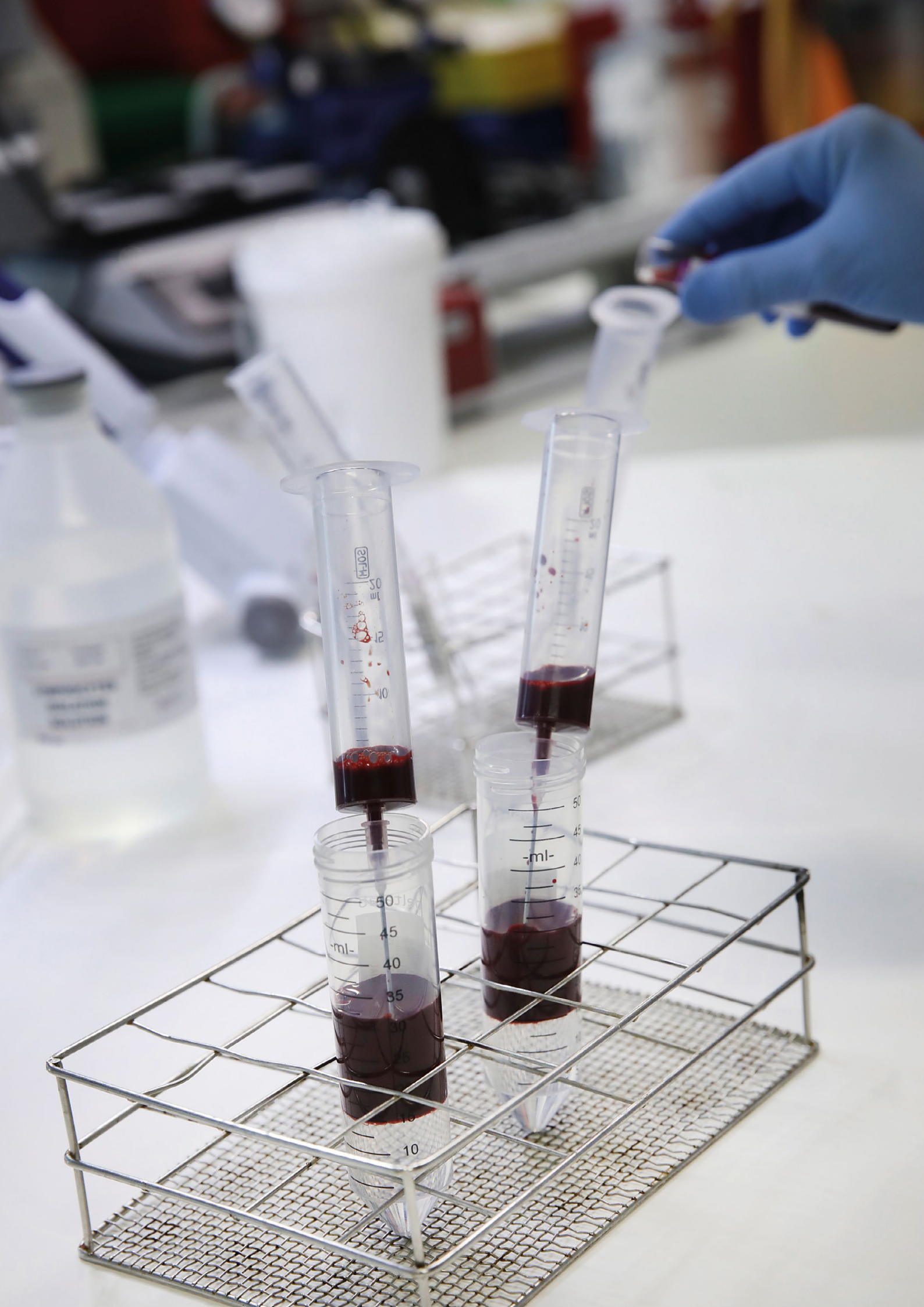
It is precisely for this reason that the Blood and Tissue Bank is the body appointed by the Government of Catalonia to promote the Advanced and Emerging Therapies Programme in Catalonia. This key leadership role aims to forge national alliances to make these new generation medications, derived from genes, cells and tissues, a reality accessible to as many patients as possible. Advanced therapies offer hope and new healing opportunities for patients who previously had none. And this is our deepest motivation: to be an active part of this commitment, which has been our *raison d'être* since the beginning.

We possess a wealth of experience that becomes more apparent each year in our published research reports; due to our continuous research activity, the increasing number of publications, the trials and projects conducted with research teams from around the world, and the international collaborations that define our daily work. We are a research institution that has steadily gained visibility, presence, and recognition in a number of fields over the past few years.

We are also, as a long-standing benchmark centre, a service platform for all scientific teams and research centres within the country's biomedical research ecosystem. We have specialised facilities, including clean rooms and cryopreservation spaces, along with accredited professionals, to support research teams and enable the development and scaling up of these new therapies, driving the leap to larger-scale production.

However, none of this would be possible without the dedicated team of people that make up the Blood and Tissue Bank. Their perseverance and excellence have brought us to where we are today, and I can confidently say that our achievements and leadership are thanks to each and every professional in our outstanding team. If we continue to work in this way, we will grow our projects and get to where we want: that is, to the patients who need us.

**Anna Millán Álvarez**





**Joaquim Delgadillo Duarte**  
Scientific Director

## Foreword by the Scientific Director

A new strategic plan to establish ourselves as leaders in research and innovation in advanced therapies and substances of human origin.

I am delighted to present the BST Research and Education Report for the year 2023.

In the previous report, I mentioned that we were closing a cycle of more than six years associated with the implementation of the previous Strategic Research Plan (2017-2020). During these almost seven years, the Research Support Office has assisted in the submission of 186 applications for external funding calls, requesting a total of €35,527,637. This has resulted in a significant annual increase in competitive funding acquisition and in the number of projects with a Principal Investigator from the Blood and Tissue Bank. Additionally, with the aim of facilitating the launch of new research projects, six internal funding calls have been made, totalling €2,668,948.

The implementation of this Plan has led to the consolidation of the core platforms of the BST: the Biobank, the genomics platform, the cellular platform, and the advanced therapy medicinal products manufacturing platform. As a result of all this effort in research and innovation, 14 new products and services have been added to the BST catalogue.

During this 2023, through a participatory and consensus-driven process, we have also worked on defining the new Strategic Research Plan for 2024-2027. This plan aims not only to consolidate and enhance existing research lines but also to ambitiously launch new lines focused primarily on advanced therapies.

It only remains for me to thank all the people at the BST who have given, are giving, and will continue to give their best to advance research and innovation in new services, products, and therapies that improve the health and well-being of our community.

**Joaquim Delgadillo Duarte**

## 2023 highlights

- **The Congenital Coagulopathies Laboratory – Genomics Platform** has secured competitive funding through the award of a project in the 2023 R&D&I Projects in Health call from ISCIII: PI23/01672, dedicated to investigating the unresolved molecular aetiology of hereditary bleeding disorders using advanced molecular tools and data integration systems.

They have been awarded two prizes from the Victoria Eugenia Royal Foundation:

The Duchess of Soria Prize for International Research on Congenital Coagulopathies 2023 for "Unravelling the genetic mechanisms underlying severe haemophilia A. Comprehensive analysis of large deletions in the F8 gene".

The Clinical Medicine Research Project prize for "Exploring the unresolved molecular basis of haemophilia through the application of third-generation long-read sequencing (TGS)".

- **BST-Analytics 2023:** the automation of the weekly call for blood donors at the 12 permanent centres of the BST network was presented at the ISBT Congress with the Harold Gunson Fellowship. This presentation has sparked the interest of several international organisations, notably the Blood Byte Circle division (BBC) of the European Blood Alliance. BBC is a recent initiative under the EBA's Innovation and New Products Working Group aimed at assessing the current use of Artificial Intelligence to manage Blood and Tissue establishments across Europe.
- **Molecular microbiology and microbiota:** the article "Characterization of Seminal Microbiome of Infertile Idiopathic Patients Using Third-Generation Sequencing Platform" has been published in the INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES (2023 Apr 26; 24(9): 7867. doi: 10.3390/ijms24097867).

We participated as speakers in the workshop "Planetary Protection Requirements for Future Exploration Missions: Assessing Metagenomic Methods For Their Inclusion In ESA Standards" by the European Space Agency, establishing the foundations for preventing biological contamination in space exploration using molecular biology methods.

Creation of the **Microbiology Laboratory**, equipped with the necessary technology and trained personnel to conduct sterility microbiological controls, microbial load assessments, and environmental microbiological monitoring. These tests are aimed at ensuring the safety and quality of BST products and supporting research. Currently, it conducts controls for blood components, milk, cell therapy, tissues, and advanced therapies. This addition enhances the areas of expertise within the laboratories of the Blood and Tissue Bank.

- **The Tissue Bank** has achieved the following:

Granting of Technological Development in Health for the development of randomised pilot trial for Transvaginal human acellular dermal matrix and sacrospinous fixation for anterior and apical prolapse treatment in patients with hiatal ballooning or levator ani injury. This multicentre project is led by Hospital Mutua de Terrassa.

**Fran Vidal**



**Anna Vilarrodona**





Launch of the VASCRAFT project in close collaboration between Germans Tries i Pujol Institute, BST and Chemical Institute of Sarrià to develop new human decellularized and re-endothelialized tissue-engineered graft for coronary artery bypass grafting.

The EGALITE project has successfully achieved all the intermediate goals and is preparing the final outcomes to be sustainable. Engagement with scientific associations and the development of IT platforms guarantee a successful pilot stage during early 2024 and ensure the continuity of EGALITE's mission thereafter.

Receipt of the award for the best oral presentation for the work titled "Development of a preservation method at 33°C for fresh osteochondral allografts" at the 31st Annual Congress of the European Association of Tissue and Cell Banks (EATCB).

Presentation of the 20-year experience of cardiovascular banking at the Barcelona Tissue Bank [CELL TISSUE BANK. 2024 Mar;25(1):11-26.].

- **The Cell Therapy Service** has developed an in-house bone marrow collection kit.

The in-house kit manufactured by the Blood and Tissue Bank was validated and published in the journal *Vox Sanguinis*.

The Cord blood and Specialised Haemotherapy group has started a clinical trial this year on cord blood red blood cell (RBC) transfusion in very preterm infants. This is the first clinical trial in Spain on this approach and demonstrates our commitment to advancing medical knowledge to contribute to improving outcomes of this vulnerable patient population. Preterm infants often face challenges related to anaemia and other blood-related issues, so exploring innovative transfusion approaches could have a positive impact.

To obtain RBCs for transfusion and platelets for regenerative medicine products, an international study on multicomponent cord blood fractionation was proposed, coordinated by the BST Cord Blood Specialized Therapy Group (Samarkanova D, Codinach M, Montemurro T, Mykhailova L, Tancredi G, Gallerano P, Mallis P, Michalopoulos E, Wynn L, Calvo J, Pello OM, Gontica I, Rebullà P, Querol S; MultiCord12 Study Group (Appendix 1). Multi-component cord blood banking: a proof-of-concept international exercise. *BLOOD TRANSFUS* 2023 Nov 3;21(6):526-537. doi: 10.2450/BloodTransfus.492. PMID: 37146297; PMID: PMC10645353.)

iPS Derived Advanced Therapies group has obtained a Public-private collaboration projects grant (Spanish Investigation Agency) for the project *EPIFIN: Engineering induced pluripotent stem cells for a novel immunotherapy of fungal infections*. This study aims to develop a CAR therapy from iPSC cells to fight incurable fungal infections. It is a 3 year project in collaboration with CSIC (Madrid) and University of Wützburg (Germany).

### 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 Catalan Department 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

Josep Inglés Lodos

#### Members

Núria Montserrat Pulido

Irene Garcia Cadenas

Laia Arnal Arasa

Marc Soler Fàbregas

Marta Chandre Jofré

Judit Vall Castelló

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

**Strategy and Innovation Director:**  
Núria Gavaldà Batalla

**Strategic Planning and Advanced Therapies Director**  
Joaquim Delgado 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 Delgado 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 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.

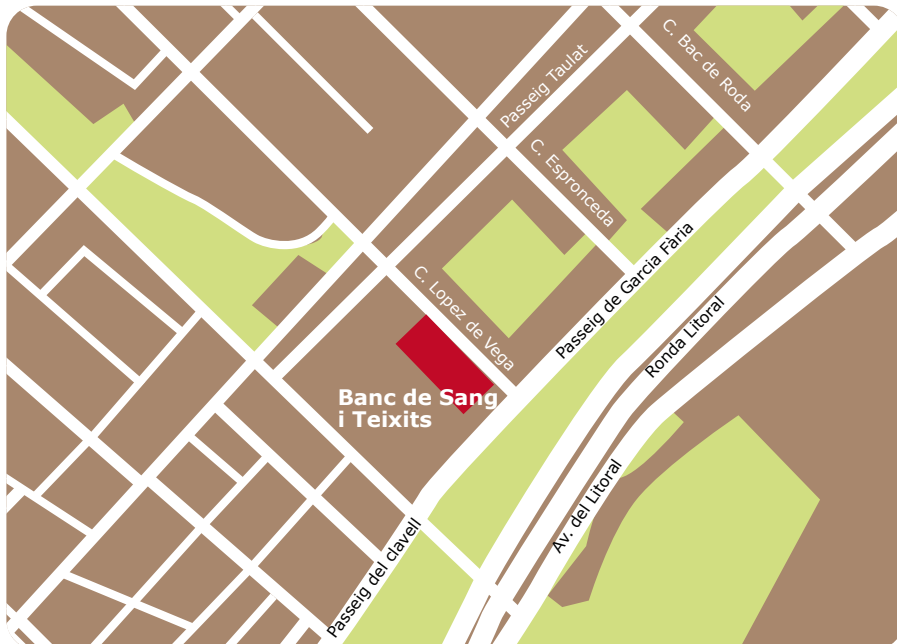
## Location

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

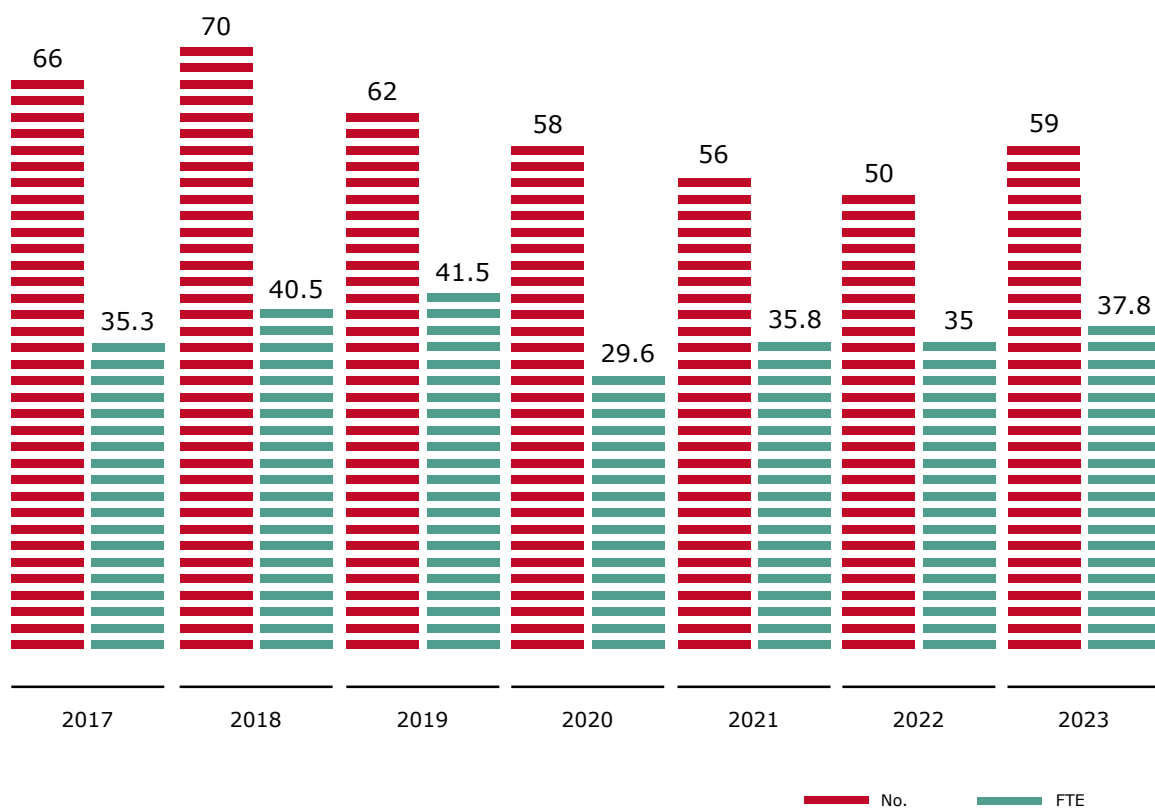
### 1.5.1. Research and technical staff

#### Research and technical staff 2023

	No.	FTE	No. of men	FTE of men	No. of women	FTE of women
Principal investigators	7	4.0	3	1.7	4	2.3
Senior researchers	26	16.8	7	4.3	19	12.5
Researchers	15	9.2	6	3.0	9	6.2
Support staff	11	7.8	0	0.0	11	7.8
<b>TOTAL</b>	<b>59</b>	<b>37.8</b>	<b>16</b>	<b>9.0</b>	<b>43</b>	<b>28.8</b>

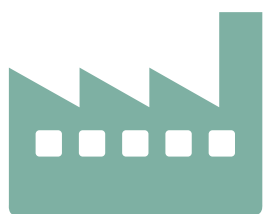
\* FTE: full-time employees

#### Research staff since 2017



## 1.5.2. Economic data

### Research funding 2023



**39,363,04€**

**Agreements  
with industry**



**2,664,277,66€**

**Own funds\***

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

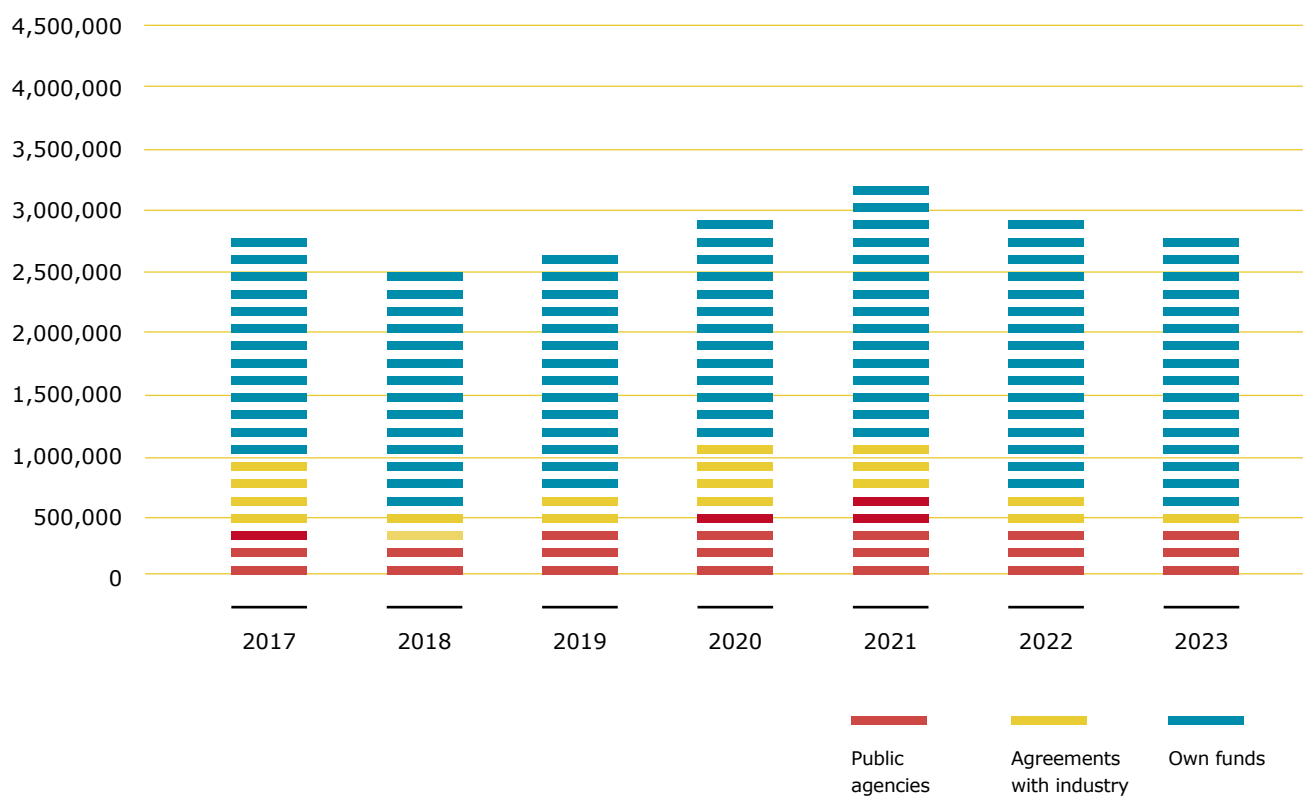


**170,656,90€**

**Public agencies**

**Total 2,874,297,70€**

### Research projects



### 1.5.3. Organisation of research at the BST

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

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R&D&I  
2017-2020

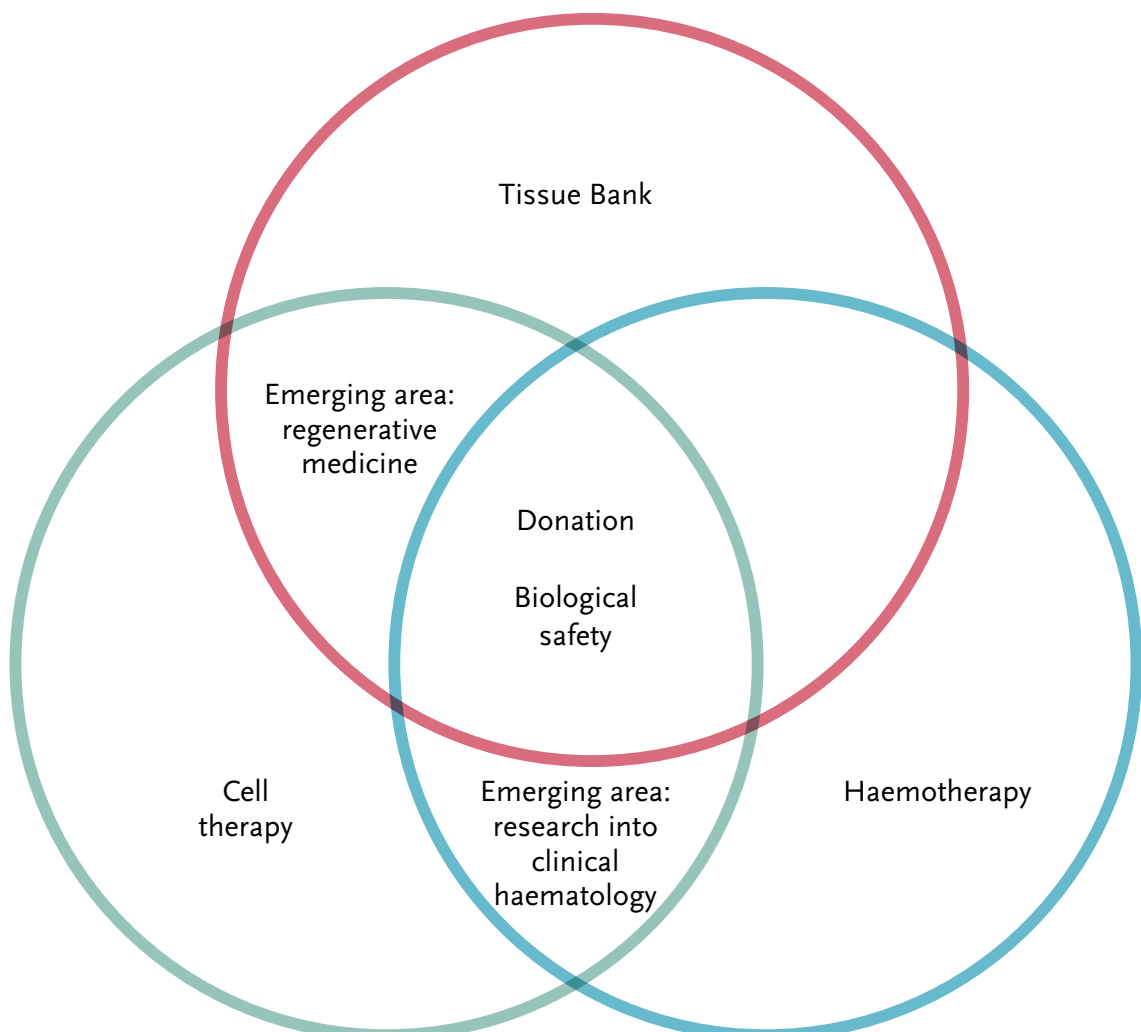
5 Research Programmes

#### Three core programmes:

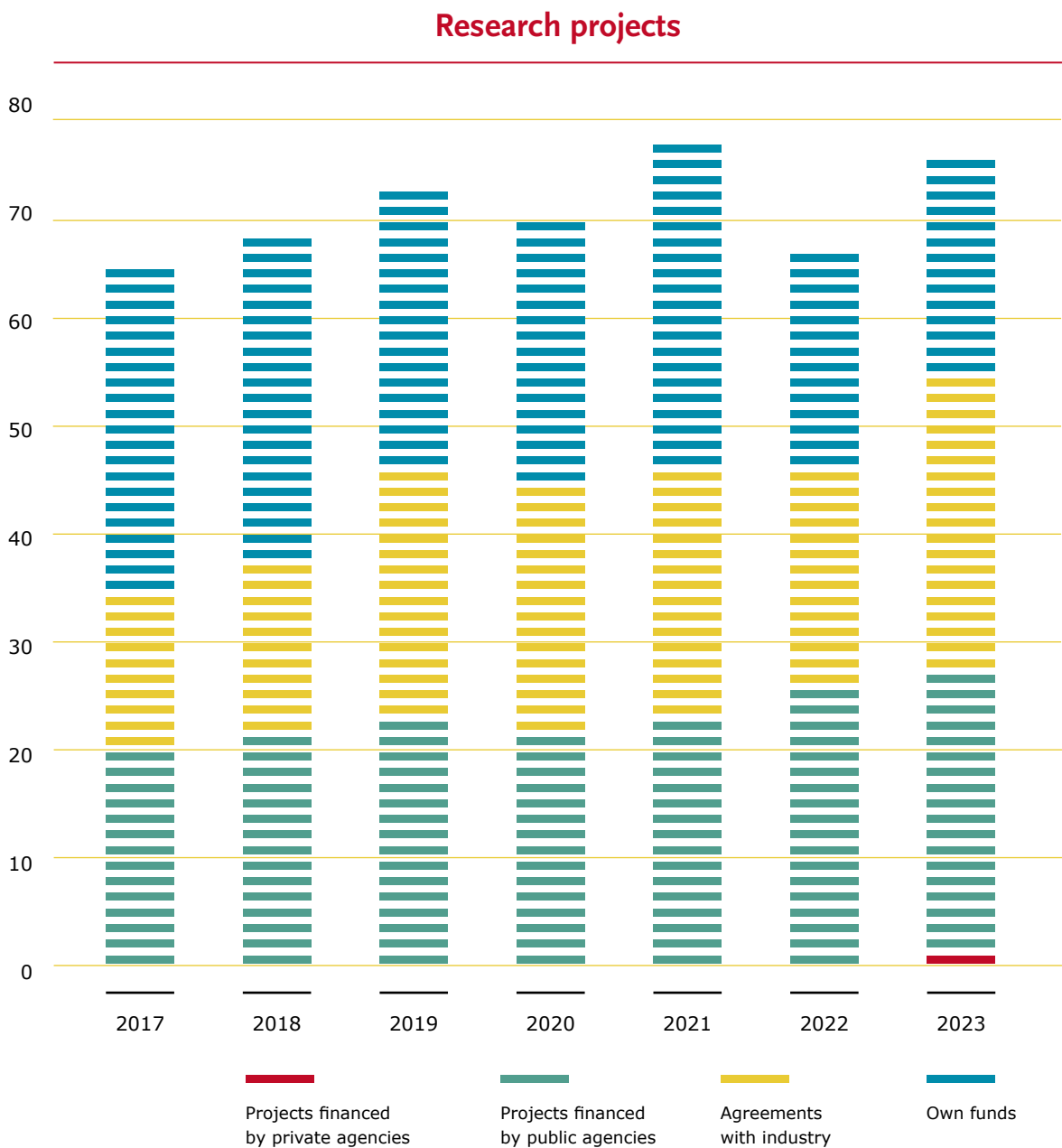
- **Haemotherapy:** immunohematology, transfusion, molecular diagnosis, process development
- **Tissue bank:** development of products and processes of the tissue bank, regenerative medicine
- **Cell therapy:** transplant immunobiology/immunotherapy, regenerative medicine

#### Two transversal programmes:

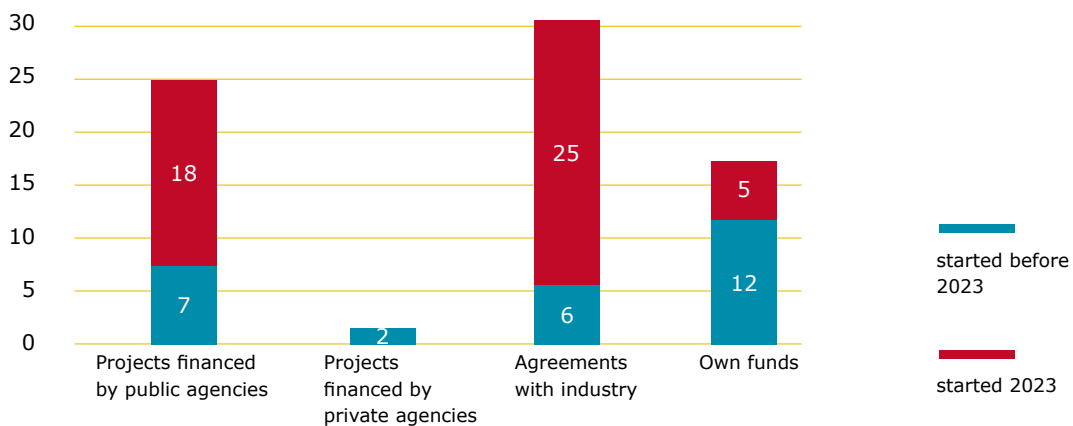
- **Biological safety:** emerging pathogens, epidemiological studies, harmonisation between products
- **Donation of blood, cells and tissues:** study of donation behaviours, donation ethics, donation promotion, protection, well-being and comfort of the donor



### 1.5.4. Research projects



### 2023



## Active projects during 2023

	BST PRINCIPAL INVESTIGATOR	COLLABORATION
<b>PUBLIC AGENCIES</b>		
Carlos III Institute of Health	5	7
European Commission	2	
IDIBAPS		1
Ludwig Maximilians Munich University		1
Spanish Investigation Agency	4	2
Vall d'Hebron Institute of Oncology		2
<b>PRIVATE AGENCIES</b>		
"La Caixa" Foundation	1	
Sant Joan de Déu Research Found.		1
<b>AGREEMENTS WITH INDUSTRY</b>		
Achilles Therapeutics Limited		1
Adaptimmune Therapeutics PLC.		3
Allogene Therapeutics		1
Allovir Inc.		1
ALX Oncology Inc.		3
Atara Biotherapeutics Inc.		2
Autolus Limited		2
BioNTech Manufacturing GmbH		2
Celgene Corporation		1
Cellnex Telecom S.A.	1	
Gilead Sciences Inc.		1
Johnson & Johnson Innovative Medicine		2
Kite Sciences Inc.		3
Igenomix		1
Instituto Grifols S.A.	1	
Iovance Biotherapeutics, Inc.		1
Medac GmbH		1
Miltenyi Biomedicine GmbH		2
Novartis Pharma AG		1
T-knife GmbH		1
<b>OWN FUNDS</b>		<b>18</b>
<b>TOTAL</b>		<b>75</b>

### 1.5.5. Doctoral theses

These were the theses read by BST researchers

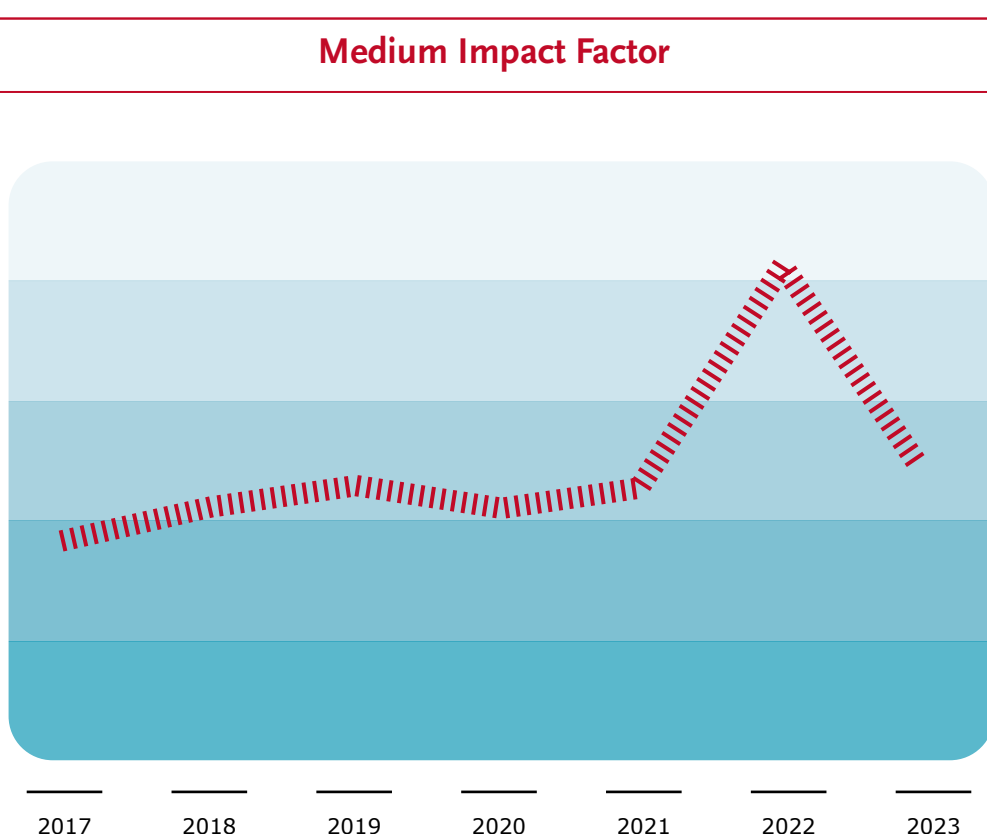
Theses		
PHD STUDENT	THESIS TITLE	DIRECTORS
Meritxell Llorens Revull	Studies of viral and host biomarkers in hepatitis C virus infected patients	Marta Bes Maijó, Josep Quer Sivila, Celia Perales Viejo
Jesus Fernandez Sojo	Peripheral blood hematopoietic progenitors: product characteristics impacting recipient and processing quality controls	Sergi Querol Giner, Joan Cid Vidal
Laura Medina Marrero	Proposal for a new consensus administration of Plerixafor, to reduce the percentage of failures of hematopoietic progenitors mobilization	Sergi Querol Giner

### 1.5.6. Publications

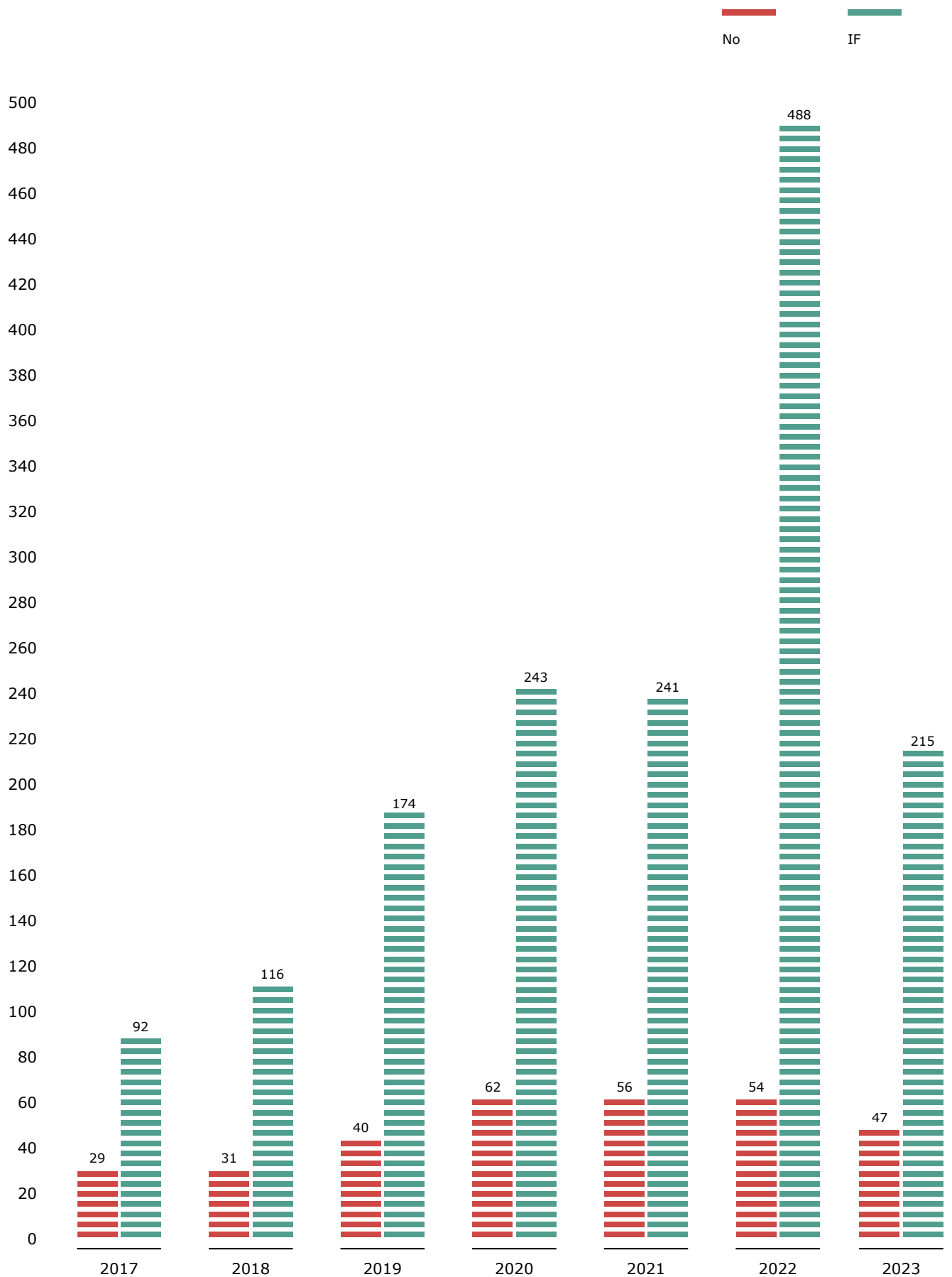
There were 47 publications by BST researchers in scientific journals in 2023, with an impact factor of 215. The average impact factor was 4.5. A 31% of the articles were published in first quartile journals.

The 2022 *Journal Citation Reports* (JCR) were used to calculate the 2023 impact factor. Original articles, reviews, and editorials were included in the calculation.

### Evolution of the BST's scientific production

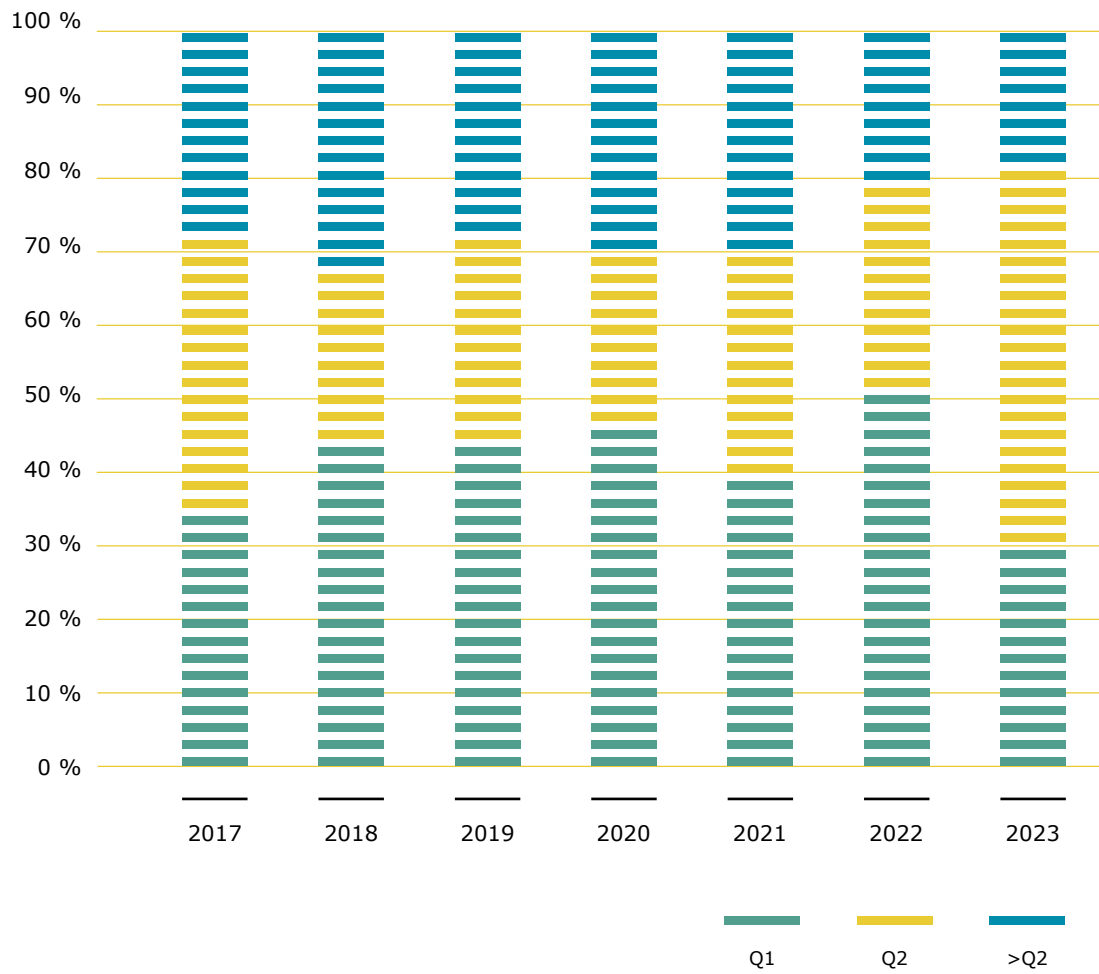


## BST scientific output since 2017

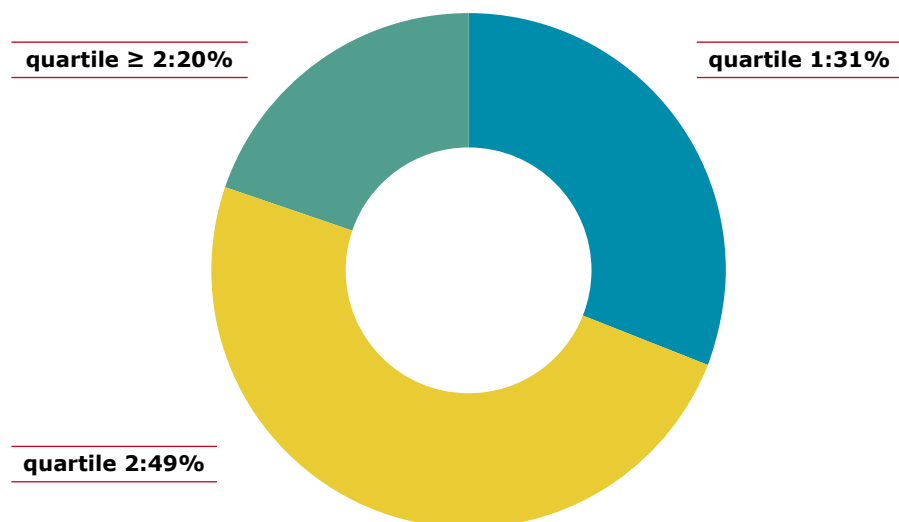


## 1.5.6. Publications

### Classification of publications



### 2023 BST publications by quartiles





### 1.5.7. Patents and protection of industrial and intellectual property

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

## 1.6. Innovation

### The Congenital Coagulopathies Laboratory – Genomics Platform

**Whole exome sequencing:** the implementation of this technique has allowed us to apply the diagnosis of hereditary connective tissue disorders, hereditary haemorrhagic telangiectasia and other vasculopathies, congenital platelet disorders, Noonan syndrome and other RASopathies, as well as congenital disorders of glycosylation in clinical practice.

**Quality control in CAR-T immunotherapy:** we participated in the quality control of an autologous T cell immunotherapy product (CAR-T) through the application of molecular studies during the production process. We have developed molecular validation techniques for the sequencing of plasmids, the viral vector, the determination of the number of copies integrated into the therapeutic gene and the envelope, the identity of the producing cells, and the residual DNA.

**Digital PCR (dPCR):** we have implemented digital PCR in various molecular studies to achieve precise detection and quantification of nucleic acids.

**Detection of Cutibacterium acnes:** we have developed and applied molecular biology techniques to detect Cutibacterium acnes in umbilical cord blood units intended for transfusion to extremely premature infants.

**BST-Analytics initiative:** this multidisciplinary data science and innovation unit of the Blood and Tissue Bank has been established to optimise donor recruitment processes, promote donation, and distribute blood products in Catalonia. Currently, we are working on a mobile collection management system to improve efficiency in donor recruitment.

### The Tissue Bank has:

Developed and validated a new preservation method for fresh osteochondral allografts to extend expiry time, aiming to optimise tissue allocation and reach more patients.

Validated the human decellularized valve procedure in a controlled microenvironment.

Designed and developed a safe and effective full-thickness acellular dermal graft using the EuroGTPII Methodologies. [THERAPEUTICS AND CLINICAL RISK MANAGEMENT 2023:19 567–578].

Developed a full-thickness acellular dermal graft for human skin, which has been used in a first case for rotator cuff patch augmentation [TRANSPL IMMUNOL 2023 Jun:78:101825].

Presented a comparative in vitro study on the predisposing factors of hamstring grafts to infection in R-ACL surgery, in collaboration with H. del Mar, Universitat Autònoma of Barcelona, and Charité-Universitätsmedizin Berlin [PATHOGENS. 2023 May 25;12(6):761].

Used decellularized nerve grafts for repairing severe peripheral nerve injuries in sheep, in collaboration with Universitat Autònoma of Barcelona [NEUROSURGERY. 2023 Dec 1;93(6):1296-1304].

Enhanced the safety of cornea preservation by incorporating an antifungal agent into the media composition.

## 1.6. Innovation

### **The Immunohaematology Laboratory**

Development of a novel high-throughput NGS method for simultaneous HPA and HLA genotyping of platelet apheresis donors.

The Immunohaematology Laboratory, in collaboration with the Histocompatibility Lab and the Genomic Platform has developed and validated a new tool for the extensive HPA and HLA Class I typing of platelet apheresis donors.

The results of this work were presented at the ISBT Congress 2023 in Gothenburg.

### **The Transfusion Safety Laboratory has:**

Pre-commercial validation of a new molecular biology reagent for the joint detection of West Nile Virus, Dengue, Zika and Chikungunya arboviruses. The evaluation carried out in the Transfusion Safety Laboratory contributed to obtaining the CE marking for the screening of blood, tissue and cell donations.

Evaluation of a commercial ELISA method for pseudo-neutralisation to ensure the neutralising potential of anti-Spike antibodies against SARS-CoV-2 in convalescent COVID plasma.

### **The Cell Therapy Service**

Creation of the GMP bioreactor platform for 3D manufacturing of mesenchymal cells derived from umbilical cord.

Manufacturing of tumour infiltrating lymphocytes (TIL) therapy to treat patients with metastatic, refractory-epithelial cancer (NEXTGEN-TIL clinical trial).

Development of a molecular testing and genomic integrity characterisation algorithm for iPSC based in WES and RNAseq in collaboration with the Group of Congenital Coagulopathies at BST and the Genomics Platform at BST (Dr Fran Vidal and Dr Irene Corrales). Manuscript in preparation.

BK Virus renal transplant. 2023-2025: Scale-up and validation of the expansion protocol of IFN- $\gamma$ + T lymphocytes against BK virus under GMP conditions as a potential therapeutic option for patients who have undergone renal transplant and are suffering for BK virus infection.







## 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  
Noemí Gonzalez Leon  
Carina Lera Asensio  
Lorena Ramírez Orihuela

**Researchers**

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

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



## Research projects

**Principal investigator:  
Núria Nogués Gálvez**

Lab-grown red cells for the transfusion management of vaso-occlusive crisis in sickle cell patients  
Funding organisation: "La Caixa" Foundation  
File: HR23-00367  
Duration: 2023 – 2026

**Principal investigator:  
Núria Nogués Gálvez**

LAB-REDCELL: Lab-grown red cells from immortalized erythroid cell lines as an alternative source of red cells with rare phenotypes for diagnostic and therapeutic applications  
Funding organisation: Spanish Investigation Agency  
File: PID2022-141849OB-I00  
Duration: 2023 – 2027

**Principal investigator:  
Francisco Vidal Perez**

RELECOV 2.0 Consolidation of WGS and RT-PCR activities for SARS-CoV-2 in Spain towards sustainable use and integration of enhanced infrastructure and processes in the RELECOV network  
Funding organisation: European Commission  
File: 101113109  
Duration: 2023 – 2025

**Principal investigator:  
M<sup>a</sup> José Herrero Mata**

Advancing in the implementation of Third Generation Sequencing technology within the field of Immunogenetics and deployment in other areas of the BST  
Funding organisation: BST  
File: I.2021.029  
Duration: 2023 – 2026

**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 – 2024

**Principal investigator:  
Laia Miquel Serra**

Lab-grown red cells from immortalized erythroid precursor cell lines as an alternative source of red cells with infrequent or rare phenotypes  
Funding organisation: BST  
File: I.2023.024  
Duration: 2023 – 2026

**Principal investigator:  
Iris Garcia Martínez**

Development of a functional model of the flow of the Blood and Tissue Bank stock based on artificial intelligence to optimize the planning of donation campaigns and the distribution of hemocomponents  
Funding organisation: BST  
File: I.2023.026  
Duration: 2023 – 2026

**Principal investigator:  
Nina Borràs Agustí**

Resolving the genetic basis of complex diagnostic inherited bleeding disorders through the application of advanced molecular tools  
Funding organisation: BST  
File: I.2023.030  
Duration: 2023 – 2026

**Principal investigator:  
Antoni Masi Roig**

Study of the life cycle of the blood and plasma donor: segmentation into stages, their transitions and design of targeted communication actions  
Funding organisation: BST  
File: I.2023.032  
Duration: 2023 – 2025

**Principal investigator:  
Vanessa Pleguezuelos  
Hernández**

Obtaining sterilized donated breast milk applying the emerging technology of ultra-high pressure homogenization (LMD-UHPH)  
Funding organisation: BST  
File: I.2023.033  
Duration: 2023 – 2025



## 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:  
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

**Principal investigator:  
Cristina Santos Vivas  
(Hospital Universitari de Bellvitge), Isabel  
Gonzalez Medina (BST)**

A phase II study of A Phase 2, Randomized, Open-Label Study Evaluating the Safety and Efficacy of Magrolimab in Combination With Bevacizumab and FOLFIRI Versus Bevacizumab and FOLFIRI in Previously Treated Advanced Inoperable Metastatic Colorectal Cancer  
Funding organisation: Gilead Sciences, Inc.  
File: 2022-500177-13  
Duration: 2023 - 2024

**Principal investigator:  
Cinta Hierro Carbó  
(Hospital Germans Trias i Pujol), Águeda  
Ancochea (BST)**

A phase 2/3 study of ALX148 in patients with advanced HER2-overexpressing gastric/gastroesophageal junction adenocarcinoma (ASPEN-06)  
Funding organisation: Alx Oncology, Inc.  
File: 2021-001008-14  
Duration: 2023 - 2024

## Publications

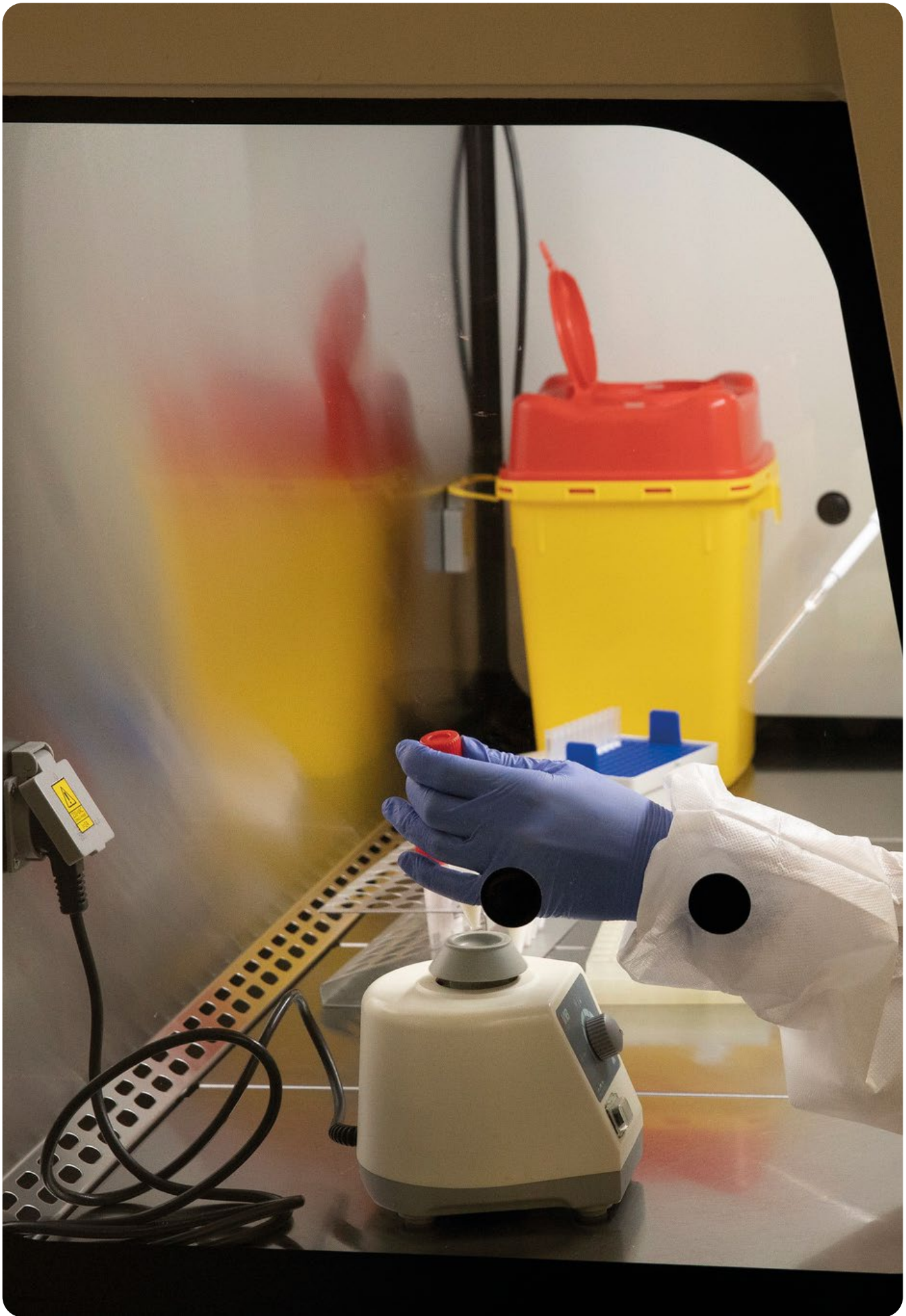
- Bandini P, Borràs N, Berruero R, Gassiot S, Martín-Fernandez L, Sarrate E, Comes N, Ramírez L, Hobeich C, Vidal F, Corrales I.** Gaining Insights into Inherited Bleeding Disorders of Complex Etiology in Pediatric Patients: Whole-Exome Sequencing as First-Line Investigation Tool. *THROMB HAEMOST.* 2023 Dec 29. doi: 10.1055/s-0043-1778070. Epub ahead of print. PMID: 38158197. IF 6.7. Q1.
- Martin-Fernandez L, Garcia-Martínez I,** Lopez S, Martinez-Perez A, Vilalta N, Plaza M, Moret C, Viñuela A, Brown AA, Panousis NI, Bul A, Dermitzakis ET, **Corrales I, Souto JC, Vidal F, Soria JM.** Multiallelic Copy Number Variation in ORM1 is Associated with Plasma Cell-Free DNA Levels as an Intermediate Phenotype for Venous Thromboembolism. *THROMB HAEMOST* 2023 Jan 25. doi: 10.1055/s-0043-1760844. PMID: 36696913. IF 6.7. Q1.
- Bandini P, Borràs N,** Fernandez Mellid E, **Martin-Fernandez L,** Melero Valentín P, **Comes N, Ramírez L,** Cadahia Fernández P, Rodríguez Ruiz M, Perez Encinas MM, **Vidal F, Corrales I.** First description of bone marrow failure syndrome in Spain caused by mutations in the ERCC6L2 gene. *BR J HAEMATOL.* 2023 Sep 11. doi: 10.1111/bjh.19050. Epub ahead of print. PMID: 37696499. IF 6.5. Q1.
- Muñoz NG, Ortega S,** Solanich X, Cid J, Díaz M, Moreno AB, **Ancochea A, Santos M,** Hernández I, Sanchez JM, Luaña A, García J, Escoda L, **Medina L, Ferrer GJ,** López J, Céspedes R, Díaz JA, **Pons V,** Valcárcel D, **Grifols JR.** Diagnosis and clinical management of thrombotic thrombocytopenic purpura (TTP): a consensus statement from the TTP Catalan group. *BLOOD TRANSFUS* 2023 Sep 4. doi: 10.2450/BloodTransfus.522. PMID: 37677097. IF 3.7. Q2.
- de la Morena-Barrio B, Palomo Á, Padilla J, **Martín-Fernández L,** Rojo-Carrillo JJ, Cifuentes R, Bravo-Pérez C, Garrido-Rodríguez P, Miñano A, Rubio AM, Pagán J, Llamas M, Vicente V, **Vidal F,** Lozano ML, Corral J, de la Morena-Barrio ME. Impact of genetic structural variants in factor XI deficiency: identification, accurate characterization, and inferred mechanism by long-read sequencing. *J THROMB HAEMOST* 2023 Mar 20:S1538-7836(23)00239-8. doi: 10.1016/j.jtha.2023.03.009. PMID: 36940803. IF 10.4. Q1.
- Garcia-Segura S, Del Rey J, **Closa L, Garcia-Martínez I, Hobeich C,** Castel AB, **Vidal F,** Benet J, Oliver-Bonet M. Characterization of Seminal Microbiome of Infertile Idiopathic Patients Using Third-Generation Sequencing Platform. *INT J MOL SCI.* 2023 Apr 26;24(9):7867. doi: 10.3390/ijms24097867. PMID: 37175573; PMCID: PMC10178615. IF 5.6. Q1
- Pardos-Gea J, **Martin-Fernandez L, Closa L,** Ferrero A, Marzo C, Rubio-Rivas M, Mitjavila F, González-Porras JR, Bastida JM, Mateo J, Carrasco M, Bernardo Á, Astigarraga I, Aguinaco R, **Corrales I, Garcia-Martínez I, Vidal F.** Key Genes of the Immune System and Predisposition to Acquired Hemophilia A: Evidence from a Spanish Cohort of 49 Patients Using Next-Generation Sequencing. *INT J MOL SCI.* 2023 Nov 15;24(22):16372. doi: 10.3390/ijms242216372. PMID: 38003562; PMCID: PMC10671092. IF 5.6. Q1.
- Pujol-Moix N, **Muñiz-Díaz E,** Español I, Mojal S, Soler E, Souto JC. Pseudothrombocytopenia, beyond a laboratory phenomenon: study of 192 cases. *ANN HEMATOL* 2023 Mar 31. doi: 10.1007/s00277-023-05192-8. PMID: 37002444. IF 3.5. Q2.
- Benítez Hidalgo O, Martinez Garcia MF, **Corrales Insa I,** Fernández-Caballero M, **Ramírez Orihuela L,** Cortina Giner V, **Comes Fernández N,** Juarez Gimenez JC. Vhrare study: Prevalence, clinical features and management of severe rare bleeding disorders in a large cohort. *EJHAEM.* 2023 Mar 9;4(2):476-482. doi: 10.1002/jha2.664. PMID: 37206292; PMCID: PMC10188473. IF 3.1. Q3.

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Moreno-Vílchez C, Muniesa C, González-Barca E, **García-Muñoz N, Ortega-Sánchez S**, Servitje O. Efficacy and safety of offline extracorporeal photopheresis in cutaneous T-cell lymphomas: A retrospective study. PHOTODERMATOL PHOTOIMMUNOL PHOTOMED. 2023 Jul 19. doi: 10.1111/phpp.12901. Epub ahead of print. PMID: 37465951. IF 2.6. Q2.

Salvia R, Rico LG, Bradford JA, Ward MD, Olszowy MW, Martínez C, Madrid-Aris AD, **Grífols JR, Ancochea Á**, Gomez-Muñoz L, Vives-Pi M, Martínez-Cáceres E, Fernández MA, Sorigue M, Petriz J. Fast-screening flow cytometry method for detecting nanoplastics in human peripheral blood. METHODSX. 2023 Feb 6;10:102057. doi: 10.1016/j.mex.2023.102057. PMID: 36851978; PMCID: PMC9958479. IF 1.9. Q2.





## 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

### **Support staff**

Kenia Rodriguez Gonzalez

### **Researchers**

Belén Álvarez Palomo

Raquel Cabrera Perez

Margarita Codinach Creus

Ruth Coll Bonet

Emma Enrich Rande

Rubén Escribá Piera

Alba Lopez Fernandez

Ruth Mora Buch

Sara Morini

Jara Palomero Gorrindo

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**

Clinical evaluation of umbilical cord blood red blood cells for transfusion in extremely premature infants  
Funding organisation: Carlos III Institute of Health  
File: PI22/00290  
Duration: 2023 – 2025

**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 – 2024

**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 – 2024

**Principal investigator:**  
**Joaquim Vives Armengol**

Translation of an allogeneic tissue-engineered product for the treatment of focal articular cartilage lesions  
Funding organisation: Carlos III Institute of Health  
File: PI22/01906  
Duration: 2023 – 2025

**Principal investigator:**  
**Joaquim Vives Armengol**

Design and validation of a platform for the production of mesenchymal cells derived from pluripotent cells with genetic characteristics of therapeutic interest and their scaling up in a bioreactor for clinical use  
Funding organisation: BST  
File: I.2023.027  
Duration: 2023 – 2026

**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 – 2024

**Principal investigator:**  
**Ana Belén 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:**  
**Ana Belén Álvarez Palomo**

EPIFIN: Engineering induced Pluripotent stem cells for a novel Immunotherapy of Fungal Infections  
Funding organisation: Spanish Investigation Agency  
File: CPP2022-009594  
Duration: 2023 – 2026

**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:**  
**Francesc Rudilla Salvador**

Application of T cell receptor sequencing in the development, optimization and characterization of antiviral cellular products.  
Funding organisation: BST  
File: I.2023.025  
Duration: 2023 – 2026

**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:**  
**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:**  
**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:**  
**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:**  
**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 – 2024

**Principal investigator:**  
**Jorge Alemany Herrera (One Chain Immunotherapeutics), Sergi Querol Giner (BST)**

Development of a dual CD1a/CCR9-directed CAR-T therapy for the treatment of R/R T-cell Acute Lymphoblastic Leukemia  
Funding organisation: Spanish Investigation Agency  
File: CPP2022-009759  
Duration: 2023 - 2026

**Principal investigator:**  
**Guillermo Orti Pascual (Hospital Universitari Vall d'Hebron), Sergi Querol Giner (BST)**

Phase I-Ib clinical trial of safety and immunobiology of the Prophylactic Infusion of  $\gamma\delta$  Lymphocytes and NK Cells from an HLA identical donor post Allo-HSCT with T depletion  
Funding organisation: Carlos III Institute of Health  
File: PI22/00710  
Duration: 2023 – 2025

**Principal investigator:**  
**Gloria Iacoboni (Hospital Universitari Vall d'Hebron)**

**BST participation:**  
**BST-HVH as Sub-Investigators; BST-STC as Cell Processing**

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 - 2023

**Principal investigator:**  
**David Valcárcel Ferreiras (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:**  
**Ana Oaknin (Hospital  
Universitari Vall  
d'Hebron)**

**BST participation:**  
**BST-HVH as Sub-  
Investigators**

A Phase 2, Multicenter  
Study to Evaluate the  
Efficacy and Safety  
Using Autologous Tumor  
Infiltrating Lymphocytes  
(LN-145) in Patients with  
Recurrent, Metastatic,  
or Persistent Cervical  
Carcinoma

Funding organisation:  
Iovance Therapeutics  
File: 2016-003447-11  
Duration: 2022 - 2024

**Principal investigator:**  
**Gloria Iacoboni (Hospital  
Universitari Vall  
d'Hebron)**

**BST participation:**  
**BST-HVH as Sub-  
Investigators; BST-STC  
as Cell Processing**

A single arm, open-label,  
multi-centre, phase I/II  
study evaluating the safety  
and clinical activity of  
auto4, a car t cell treatment  
targeting TRBC1, in patients  
with relapsed or refractory  
TRBC1 positive selected T  
cell non-Hodgkin Lymphoma

Funding organisation:  
Autolus Ltd  
File: 2017-001965-26  
Duration: 2020 - 2023

**Principal investigator -  
Pediatrics: Constantino  
Sabado (Hospital  
Universitari Vall d'Hebron)**

**BST participation:**  
**BST-HVH as Sub-  
Investigators; BST-STC  
as Cell Processing**

Multicenter, Open-  
Label, Phase 3 Study of  
Tabelecleucel for Solid Organ  
or Allogeneic Hematopoietic  
Cell Transplant Subjects  
with Epstein-Barr Virus-  
Associated Post-Transplant  
Lymphoproliferative  
Disease after Failure of  
Rituximab or Rituximab  
and Chemotherapy (ALLELE  
Study)

Funding organisation:  
Atara Biotherapeutics  
File: 2017-002949-30  
Duration: 2020 - 2024

**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 - 2024

**Principal investigator:**  
**Pere Barba (Hospital  
Universitari Vall  
d'Hebron)**

**BST participation:**  
**BST-HVH as Sub-  
Investigators; BST-STC  
as Cell Processing**

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: 2021 - 2024

**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:**  
**Pere Barba (Hospital  
Universitari Vall d'Hebron)**  
**BST participation: BST-  
HVH as Sub-Investigators;  
BST-STC as Cell  
Processing**

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.  
Funding organisation:  
Autolus Therapeutics Ltd  
File: 2019-001937-16  
Duration: 2021 - 2023

**Principal investigator:**  
**Claudia Valverde Morales  
(Hospital Universitari  
Vall d'Hebron)**

**BST participation:**  
**BST-HVH as Sub-  
Investigators; BST-STC  
as Cell Processing**

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 - 2024

**Principal investigator:**  
**Eva Muñoz (Hospital  
Universitari Vall  
d'Hebron)**

**BST participation:**  
**BST-HVH as Sub-  
Investigators; BST-STC  
as Cell Processing**

An open-label, phase I  
study of NEO-PTC-01 in  
patients with advanced or  
metastatic melanoma  
Funding organisation:  
Biontech  
File: 2019-003908-13  
Duration: 2021 - 2024



**Principal investigator:**  
**Elena Garralda (Hospital  
Universitari Vall d'Hebron)**  
**BST participation:**  
**BST-HVH as Sub-  
Investigators; BST-STC  
as Cell Processing**

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 – 2024

**Principal investigator:**  
**María Solá (Hospital  
Universitari Vall d'Hebron)**  
**BST participation:**  
**BST-HVH as Sub-  
Investigators; BST-STC  
as Cell Processing**

A Randomised, Open-label, Multicentre, Phase 3 Trial of First-line Treatment with Mesenchymal Stromal Cells MC0518 Versus Best Available Therapy in Adult and Adolescent Subjects with Steroid-refractory Acute Graft-versus-host Disease After Allogeneic Haematopoietic Stem Cell Transplantation (IDUNN Trial)  
Funding organisation:  
Medac GmbH  
File: 2019-001462-15  
Duration: 2021 – 2024

**Principal investigator:**  
**Elena Garralda (Hospital  
Universitari Vall d'Hebron)**  
**BST participation:**  
**BST-HVH as Sub-  
Investigators; BST-STC as  
Cell Processing; BST-FTA  
as Manufacturing Plant**

A Phase I study to assess the safety and tolerability of ex vivo next-generation neoantigen-selected Tumor-infiltrating Lymphocyte (TIL) therapy in advanced epithelial tumors and immune checkpoint blockade (ICB) resistant solid tumors.  
Funding organisation:  
Vall d'Hebron Institute of Oncology  
File: 2020-005778-90  
Duration: 2020 – 2024

**Principal investigator:**  
**Elena Garralda (Hospital  
Universitari Vall d'Hebron)**  
**BST participation: BST-  
HVH as Sub-Investigators;  
BST-STC as Cell  
Processing**

A phase Ib study with a safety lead-in cohort and expansion phase, of the safety, tolerability, biological effect, and efficacy of allogenic natural killer cells in combination with trastuzumab and pertuzumab in adult patients with refractory metastatic Her2 positive breast cancer  
Funding organisation:  
Vall d'Hebron Institute of Oncology  
File: 2020-004543-84  
Duration: 2023 - 2024

**Principal investigator  
- Adults: Pere Barba  
(Hospital Universitari Vall  
d'Hebron)**  
**Principal investigator -  
Pediatrics: Pere Soler  
(Hospital Universitari Vall  
d'Hebron)**  
**BST participation: BST-  
HVH as Sub-Investigators;  
BST-STC as Cell  
Processing**

An open-label, single-arm, multicohort, phase II study to assess the efficacy and safety of tabellecleucel in subjects with Epstein-Barr virus-associated diseases  
Funding organisation: Atara Biotherapeutics, Inc.  
File: 2020-000177-25  
Duration: 2021 – 2024

**Principal investigator:**  
**Elena Elez (Hospital  
Universitari Vall d'Hebron)**  
**BST participation: BST-  
HVH as Sub-Investigators;  
BST-STC as Cell  
Processing**

A multi-site, open-label, Phase II, randomized, controlled trial to compare the efficacy of RO7198457 versus watchful waiting in resected, Stage II (high risk) and Stage III colorectal cancer patients who are ctDNA positive following resection  
Funding organisation:  
Biontech  
File: 2020-000451-12  
Duration: 2021 – 2024

## Collaboration projects

**Principal investigator:**  
**Cristina Saura (Hospital Universitari Vall d'Hebron)**  
**BST participation:**  
**BST-HVH as Sub-Investigators; BST-STC as Cell Processing**

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 – 2024

**Principal investigator:**  
**Gloria Iacoboni (Hospital Universitari Vall d'Hebron)**  
**BST participation:**  
**BST-HVH as Sub-Investigators; BST-STC as Cell Processing**

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 – 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:**  
**Pere Barba (Hospital Universitari Vall d'Hebron)**  
**BST participation:**  
**BST-HVH as Sub-Investigators; BST-STC as Cell Processing**

A Phase 3 Randomized, Open-Label, Multicenter Study Evaluating the Efficacy of Axicabtagene Ciloleucl Versus Standard of Care Therapy in Subjects with Relapsed/Refractory Follicular Lymphoma  
Funding organisation: Kite Pharma, Inc  
File: 2021-003260-28  
Duration: 2023 - 2024

**Principal investigator:**  
**Cecilia Carpio (Hospital Universitari Vall d'Hebron)**  
**BST participation:**  
**BST-HVH as Sub-Investigators; BST-STC as Cell Processing**

A Phase 3 Randomized Study Comparing Bortezomib, Lenalidomide and Dexamethasone (VRd) followed by Ciltacabtagene Autoleucl, a Chimeric Antigen Receptor T cell (CAR-T) Therapy Directed Against BCMA versus Bortezomib, Lenalidomide, and Dexamethasone (VRd) followed by Lenalidomide and Dexamethasone (Rd) Therapy in Participants with Newly Diagnosed Multiple Myeloma for Whom Hematopoietic Stem Cell Transplant is Not Planned as Initial Therapy  
Funding organisation: Johnson & Johnson Innovative Medicine  
File: 2021-001242-35  
Duration: 2021 – 2024

**Principal investigator:**  
**Elena Garralda (Hospital Universitari Vall d'Hebron)**  
**BST participation:**  
**BST-HVH as Sub-Investigators; BST-STC as Cell Processing**

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

## Collaboration projects

**Principal investigator:**  
**Cristina Diaz de Heredia (Hospital Universitari Vall d'Hebron)**

**BST participation:**  
**BST-HVH as Sub-Investigators; BST-STC as Cell Processing**

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:**  
**Ana Oaknin (Hospital Universitari Vall d'Hebron)**

**BST participation:**  
**BST-HVH as Sub-Investigators; BST-STC as Cell Processing**

Phase 2, open-label, randomized, non-comparative clinical trial of ADP-A2M4CD8 monotherapy and in combination with Nivolumab in subjects with recurrent ovarian cancers  
Funding organisation: Adaptimmune Therapeutics PLC  
File: 2022-003176-16  
Duration: 2023 – 2024

**Principal investigator:**  
**Pere Barba (Hospital Universitari Vall d'Hebron)**

**BST participation:**  
**BST-HVH as Sub-Investigators; BST-STC as Cell Processing**

A Single-Arm, Open-Label, Phase 1/2 Study Evaluating the Safety, Efficacy, and Cellular Kinetics/Pharmacodynamics of ALLO-501A, an Anti-CD19 Allogeneic CAR T Cell Therapy, and ALLO-647, an Anti-CD52 Monoclonal Antibody, in Subjects with Relapsed/Refractory Large B Cell Lymphoma (LBCL).  
Funding organisation: Allogene Therapeutics Inc.  
File: 2022-501927-25  
Duration: 2023 - 2024

**Principal investigator:**  
**Cristina Diaz de Heredia (Hospital Universitari Vall d'Hebron)**

**BST participation:**  
**BST-HVH as Sub-Investigators; BST-STC as Cell Processing**

Phase 2 study of the infusion of differentiated autologous T-cells from peripheral blood, expanded and transduced with a lentivirus to express a chimeric antigen receptor with anti-CD19 specificity (A3B1) conjugated with the co-stimulatory regions 4-1BB and CD3z (ARI-0001 cells) in children and adolescents aged 0-18 years with CD19+ acute lymphoblastic leukaemia resistant or refractory to treatment  
Funding organisation: Fundació Privada per a la Recerca i la docència Sant Joan de Déu  
File: 2022-001101-52  
Duration: 2023 – 2024

**Principal investigator:**  
**Gloria Iacoboni (Hospital Universitari Vall d'Hebron)**

**BST participation:**  
**BST-HVH as Sub-Investigators; BST-STC as Cell Processing**

An Adaptive Phase 3, Randomized, Open-Label, Multicenter Study to Compare the Efficacy and Safety of Axicabtagene Ciloleucel versus Standard of Care Therapy as First-Line Therapy in Subjects with High-Risk Large B-Cell Lymphoma  
Funding organisation: Kite Pharma, Inc  
File: 2022-000649-33  
Duration: 2023 – 2024

**Principal investigator:**  
**Josefina Cortés (Hospital Universitari Vall d'Hebron)**

**BST participation:**  
**BST-HVH as Sub-Investigators; BST-STC as Cell Processing**

An open-label, multi-center, phase ½ study to assess safety, efficacy and cellular kinetics of YTB323 in participants with severe, refractory systemic lupus erythematosus (srSLE)  
Funding organisation: Novartis  
File: 2022-001796-14  
Duration: 2023 – 2024

**Principal investigator:**  
**Pere Barba (Hospital Universitari Vall d'Hebron)**

**BST participation:**  
**BST-HVH as Sub-Investigators; BST-STC as Cell Processing**

A randomized, open-label, multi-center phase III trial comparing tisagenlecleucel to standard of care in adult participants with relapsed or refractory follicular lymphoma  
Funding organisation: Johnson & Johnson Innovative Medicine  
File: 2023-503452-27-00  
Duration: 2023 – 2024

## Publications

- Cabrera-Pérez R**, Ràfols-Mitjans A, Roig-Molina À, Beltramone S, **Vives J**, Batlle-Morera L. Human Wharton's jelly-derived mesenchymal stromal cells promote bone formation in immunodeficient mice when administered into a bone microenvironment. *J TRANSL MED*. 2023 Nov 10;21(1):802. doi: 10.1186/s12967-023-04672-9. PMID: 37950242. IF 7.4. Q1.
- Delgadillo J**, Kerkelä E, Waters A, Akker EVD, Lechanteur C, Baudoux E, Gardiner N, De Vos J, **Vives J**. A management model in blood, tissue and cell establishments to ensure rapid and sustainable patient access to advanced therapy medicinal products in Europe. *CYTOTHERAPY*. 2023 Sep 5:S1465-3249(23)01015-0. doi: 10.1016/j.jcyt.2023.08.001. Epub ahead of print. PMID: 37737767. IF 4.5. Q2.
- López-Fernández A**, **Codinach M**, **Coca MI**, **Prat-Vidal C**, **Castaño J**, **Torrents S**, **Aran G**, **Rodríguez L**, **Querol S**, **Vives J**. Comparability exercise of critical quality attributes of clinical-grade human mesenchymal stromal cells from the Wharton's jelly: single-use stirred tank bioreactors versus planar culture systems. *CYTOTHERAPY*. 2023 Sep 15:S1465-3249(23)01039-3. doi: 10.1016/j.jcyt.2023.08.008. Epub ahead of print. PMID: 37715777. IF 4.5. Q2.
- Vives J**, Sánchez-Guijo F, Gnecci M, Zwaginga JJ. Cell and gene therapy workforce development: the role of the International Society for Cell & Gene Therapy (ISCT) in the creation of a sustainable and skilled workforce in Europe. *CYTOTHERAPY*. 2023 Jul 27:S1465-3249(23)00982-9. doi: 10.1016/j.jcyt.2023.06.006. Epub ahead of print. PMID: 37498257. IF 4.5. Q2.
- Torrents S**, Del Moral AE, **Codinach M**, **Rodríguez L**, **Querol S**, **Vives J**. Optimized reagents for immunopotency assays on mesenchymal stromal cells for clinical use. *Immunol Res*. 2023 Apr 29:1-10. doi: 10.1007/s12026-023-09385-1. Epub ahead of print. PMID: 37120479; PMCID: PMC10148700. IF 4.4. Q2.
- Martorell L**, **López-Fernández A**, García-Lizarribar A, Sabata R, Gálvez-Martín P, Samitier J, **Vives J**. Preservation of critical quality attributes of mesenchymal stromal cells in 3D bioprinted structures by using natural hydrogel scaffolds. *BIOTECHNOL BIOENG*. 2023 Mar 14. doi: 10.1002/bit.28381. PMID: 36919270. IF 3.8. Q2.
- Samarkanova D**, **Codinach M**, Montemurro T, Mykhailova L, Tancredi G, Gallerano P, Mallis P, Michalopoulos E, Wynn L, Calvo J, Pello OM, Gontica I, Rebullà P, **Querol S**; MultiCord12 Study Group (Appendix 1). Multi-component cord blood banking: a proof-of-concept international exercise. *BLOOD TRANSFUS* 2023 Mar 3. doi: 10.2450/BloodTransfus.492. PMID: 37146297. IF 3.7. Q2.
- Mora-Buch R**, **Tomás-Marín M**, **Enrich E**, **Antón-Iborra M**, **Martorell L**, **Valdivia E**, **Lara-de-León AG**, **Aran G**, **Piron M**, **Querol S**, **Rudilla F**. Virus-specific T cells from cryopreserved blood during an emergent virus outbreak for a potential off-the-shelf therapy. *TRANSPLANT CELL THER* 2023 Jun 6:S2666-6367(23)01324-6. doi: 10.1016/j.jtct.2023.06.001. PMID: 37290691. IF 3.2. Q2.
- Fernandez-Sojo J**, **Valdivia E**, Esquirol A, Portos JM, Rovira M, Suarez M, Diaz-de-Heredia C, Uría ML, Ortí G, Ferra C, Mussetti A, Paviglianiti A, Marsal J, Badell I, Lozano M, Gomez D, **Azqueta C**, **Martorell L**, Rubio N, **García-Buendía A**, Villa J, Carreras E, Querol S. Development of an in-house bone marrow collection kit: The Catalan bone marrow transplantation group experience. *VOX SANG*. 2023 Sep;118(9):783-789. doi: 10.1111/vox.13499. Epub 2023 Aug 2. PMID: 37533171. IF 2.7. Q3.
- Kuebler B, **Alvarez-Palomo B**, Aran B, **Castaño J**, **Rodríguez L**, Raya A, **Querol Giner S**, Veiga A. Generation of a bank of clinical-grade, HLA-homozygous iPSC lines with high coverage of the Spanish population. *STEM CELL RES THER*. 2023 Dec 13;14(1):366. doi: 10.1186/s13287-023-03576-1. PMID: 38093328; PMCID: PMC10720139. IF 7.5. Q1.

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- Gonzaga A, Andreu E, Hernández-Blasco LM, Meseguer R, Al-Akioui-Sanz K, Soria-Juan B, Sanjuan-Gimenez JC, Ferreras C, Tejedo JR, Lopez-Lluch G, Goterris R, Maciá L, Sempere-Ortells JM, Hmadcha A, Borobia A, Vicario JL, Bonora A, Aguilar-Gallardo C, Poveda JL, Arbona C, Alenda C, Tarín F, Marco FM, Merino E, Jaime F, Ferreres J, Figueira JC, Cañada-Illana C, **Querol S**, Guerreiro M, Eguizabal C, Martín-Quirós A, Robles-Marhuenda Á, Pérez-Martínez A, Solano C, Soria B. Rationale for combined therapies in severe-to-critical COVID-19 patients. *FRONT IMMUNOL*. 2023 Sep 11;14:1232472. doi: 10.3389/fimmu.2023.1232472. PMID: 37767093; PMCID: PMC10520558. IF 7.3. Q1.
- Gustà MF, Edel MJ, Salazar VA, **Alvarez-Palomo B**, Juan M, Brogginini M, Damia G, Bigini P, Corbelli A, Fiordaliso F, Barbul A, Korenstein R, Bastús NG, Puntès V. Exploiting endocytosis for transfection of mRNA for cytoplasmatic delivery using cationic gold nanoparticles. *FRONT IMMUNOL*. 2023 May 9;14:1128582. doi: 10.3389/fimmu.2023.1128582. PMID: 37228592; PMCID: PMC10205015. IF 7.3. Q1.
- Álvarez I, Tirado-Herranz A, **Alvarez-Palomo B**, Osete JR, Edel MJ. Proteomic Analysis of Human iPSC-Derived Neural Stem Cells and Motor Neurons Identifies Proteasome Structural Alterations. *CELLS*. 2023 Dec 8;12(24):2800. doi: 10.3390/cells12242800. PMID: 38132120; PMCID: PMC10742145. IF 6.0. Q2.
- Sánchez-Guijo F, Avendaño-Solá C, Badimón L, Bueren J A, Canals J M, **Delgadillo J**, Delgado J, Eguizabal C, Fernández-Santos M E, García-Olmo D, González-Asequinolaza G, Juan M, Martín F, Mata R, Montserrat N, Pérez-Martínez A, Pérez-Simón J A, Prósper F, Urbano-Ispizua A, Zapata A G, Sureda A, Moraleda J M. Role of Hospital Exemption in Europe: position paper from the Spanish Advanced Therapy Network (TERAV). *BONE MARROW TRANSPLANT* (2023). <https://doi.org/10.1038/s41409-023-01962-0>. IF 4.8. Q2.
- Guarga L, Paco N, Manchon-Walsh P, Vela E, **Delgadillo J**, Pontes C, Borràs JM. Management, Survival, and Costs of Pancreatic Cancer: Population-Based Observational Study in Catalonia. *INT. J. ENVIRON. RES. PUBLIC HEALTH* 2023, 20, 5673. <https://doi.org/10.3390/ijerph20095673>. IF 4.6. Q2.
- Sánchez-Sierra N, Perez-Somarriba M, Santa-Maria V, Cruz O, **García-Rey E**, Martorell L, Rovira M, Margarit A, Marsal J. Syngeneic hematopoietic stem cell transplantation after mobilization failure in an adolescent with intracranial germ cell tumor. *PEDIATR BLOOD CANCER*. 2023 May;70(5):e30177. doi: 10.1002/pbc.30177. Epub 2023 Jan 10. PMID: 36625393. IF 3.2. Q2.
- Regalado-Artamendi I, García-Fasanella M, **Medina L**, **Fernandez-Sojo J**, Esquirol A, García-Cadenas I, Martino R, Briones J, Sierra J, Novelli S. Age, CD34+ cell dose, conditioning and pre-transplant cytopenias can help predict transfusion support in lymphoma patients undergoing autologous stem cell transplantation. *VOX SANG*. 2023 Aug;118(8):681-689. doi: 10.1111/vox.13486. Epub 2023 Jun 25. PMID: 37356813. IF 2.7. Q3.

## 2.3.

# Tissue Bank programme

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

Researchers also play a coordinating role in projects, assessing their feasibility and, when possible, securing resources for their development through competitive public grants (Spain and the European Community), as well as from private entities, foundations and industry partners.

Our research programme promotes self-sustainability and fosters innovation through collaboration with the business sector, working in coordination with leading translational research clinical groups in the national and international context.



Translational research is a tool for continuous improvement, with a focus on addressing therapeutic needs using effective and appropriate approaches and procedures.

The strategy of our RDI program strengthens the various research lines identified as strategic for the organization, while keeping key factors in mind, such as our primary focus on patient care. Furthermore, adherence to ethical and regulatory standards, a commitment to quality and excellence, and a focus on sustainability are essential pillars throughout the process.

**Director**

Cristina Castells Sala

Ana Bofill Ródenas  
Oscar Fariñas Barbera  
Laura López Puerto

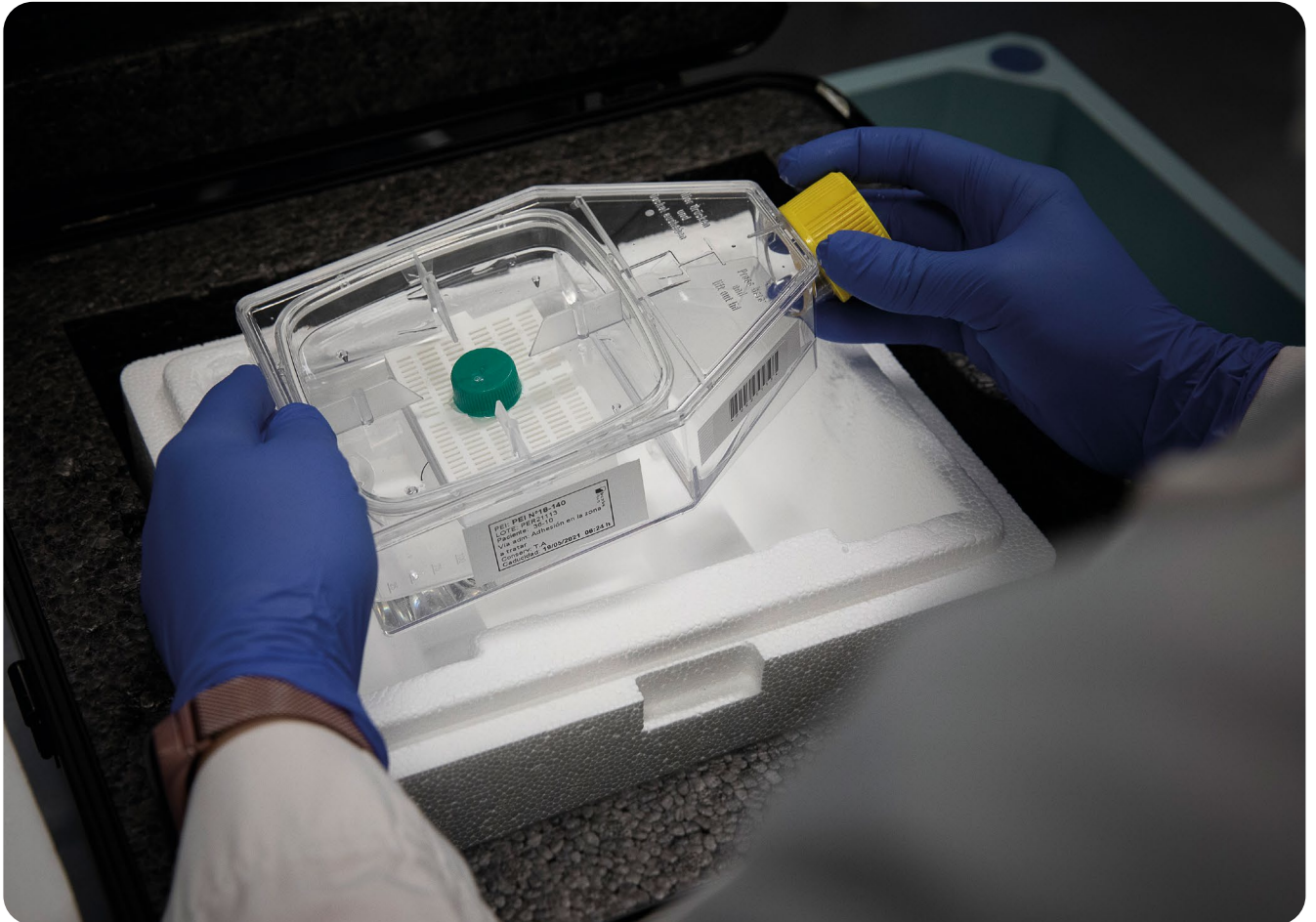
José Ignacio Rodríguez  
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**Researchers**

Elba Agustí Robira  
Ana Rita Baptista Piteira  
Raquel Bermudo Gascón

Eva Maria Martínez Conesa  
Nausica Otero Areitio  
Maria Luisa Pérez Rodríguez  
Natzaret Pujagut Mercader

Laia Ruiz Ponsell  
Andrés Savío López  
Jaime Tabera Fernandez  
Carlos Torrico León  
Anna Vilarrodona Serrat



# 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 Barbera 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 – 2023

**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 – 2023

**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 – 2024

**Principal investigator:  
Laia Ruiz Ponsell**

Development of a large caliber decellularized nerve production protocol for clinical use in peripheral nerve regeneration  
Funding organisation: BST  
File: I.2023.028  
Duration: 2023 – 2026

**Principal investigator:  
Oscar Fariñas Barbera**

Development of SoHo bioinks for 3D bioprinting of an osteochondral graft prototype  
Funding organisation: BST  
File: I.2023.031  
Duration: 2023 – 2026



## Publications

- Aloy-Reverté C, Bandeira F, **Otero N**, Rebollo-Morell A, Nieto-Nicolau N, Gomes JÁP, Güell JL, Casaroli-Marano RP. Corneal Endothelial Cell Cultures from Organotypic Preservation of Older Donor Corneas Are Suitable for Advanced Cell Therapy. *OPHTHALMIC RES.* 2023;66(1):1254-1265. doi: 10.1159/000533701. Epub 2023 Sep 18. PMID: 37722372; PMCID: PMC10614447. IF 2.0. Q2.
- López-Chicón P, Pérez ML, Castells-Sala C, Piteira AR, Fariñas O, Tabera J, Vilarrodona A.** Quality by Design: Development of Safe and Efficacious Full-Thickness Acellular Dermal Matrix Based on EuroGTPII Methodologies. *THER CLIN RISK MANAG* 2023 Jul 4;19:567-578. doi: 10.2147/TCRM.S410574. PMID: 37425344; PMCID: PMC10325720. IF 2.8. Q3
- Castells-Sala C, Pérez ML, Agustí E**, Aiti A, Tarragona E, **Navarro A, Tabera J, Fariñas O**, Pomar JL, **Vilarrodona A.** Last twenty-years activity of cardiovascular tissue banking in Barcelona. *CELL TISSUE BANK.* 2023 Feb 27:1–16. doi: 10.1007/s10561-022-10059-9. Epub ahead of print. PMID: 36849631; PMCID: PMC9970124. IF 1.5. Q4.
- Castells-Sala C, Pérez ML, López-Chicón P, Lopez-Puerto L, Martínez JIR, Ruiz-Ponsell L**, Aiti A, Madariaga SE, Sastre S, **Fariñas O, Vilarrodona A.** Development of a full-thickness acellular dermal graft from human skin: Case report of first patient rotator cuff patch augmentation repair. *TRANSPL IMMUNOL* 2023 Mar 18;78:101825. doi: 10.1016/j.trim.2023.101825. PMID: 36934900. IF 1.5. Q4.
- Cuende N, **Vilarrodona A**, Vuelta E, Marazuela R, Herrera C, **Querol S**, Sánchez-Ibáñez J, Carmona M, Gayá A, Tort J, Hernández D, Domínguez-Gil B. Addressing Risks Derived From the Commodification of Substances of Human Origin: A European Proposal Applicable Worldwide. *TRANSPLANTATION* 2023 Feb 1. doi: 10.1097/TP.0000000000004527. PMID: 36721301. IF 6.2. Q1.
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- Corcoll F, Pérez-Prieto D, Karbysheva S, Trampuz A, **Fariñas O**, Monllau JC. Are Hamstring Grafts a Predisposing Factor to Infection in R-ACL Surgery? A Comparative In Vitro Study. *PATHOGENS.* 2023 May 25;12(6):761. doi: 10.3390/pathogens12060761. PMID: 37375451; PMCID: PMC10301445. IF 3.7. Q2.
- Sabater-Cruz N, Figueras-Roca M, **Martínez-Conesa EM, Vilarrodona A**, Casaroli-Marano RP. Pterygium surgery with lyophilized versus cryopreserved amniotic membrane graft. *J FR OPHTALMOL* 2023 Mar;46(3):258-265. doi: 10.1016/j.jfo.2022.08.014. Epub 2023 Feb 13. PMID: 36792470. IF 1.2. Q4.
- Schwab N, Jordana X, Soler J, Garrido X, Brillas P, **Savio A**, Lavín S, Ortega M, Galtés I. CanSynbone® cylinders and deer femurs reproduce ballistic fracture patterns observed in human long bones?. *JOURNAL OF MATERIALS SCIENCE.* 2023; 58(11). DOI:10.1007/s10853-023-08333-6. IF 3.5. Q2.

## 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 Healthcare 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

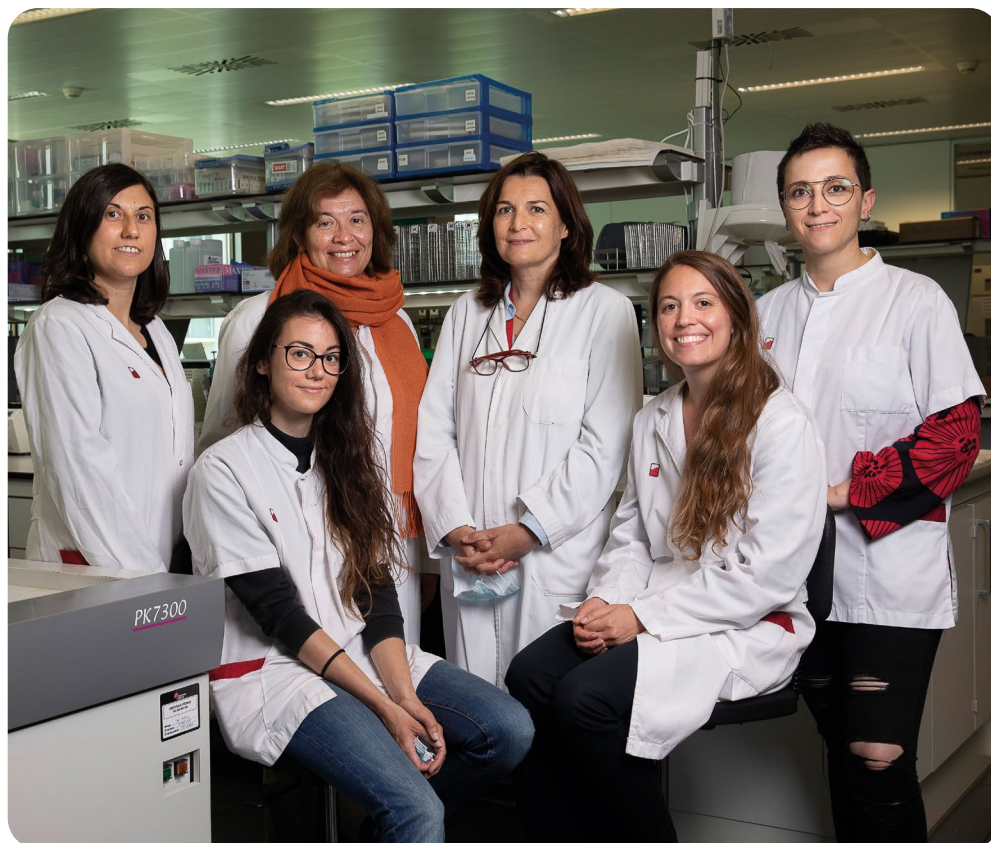
Sílvia Sauleda Oliveras

### Researchers

Marta Bes Maijó  
Meritxell Llorens Revull  
Maria Piron

### Support staff

Angeles Rico Blázquez  
Esther Vicente Encina



# 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 – 2023

**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 – 2023

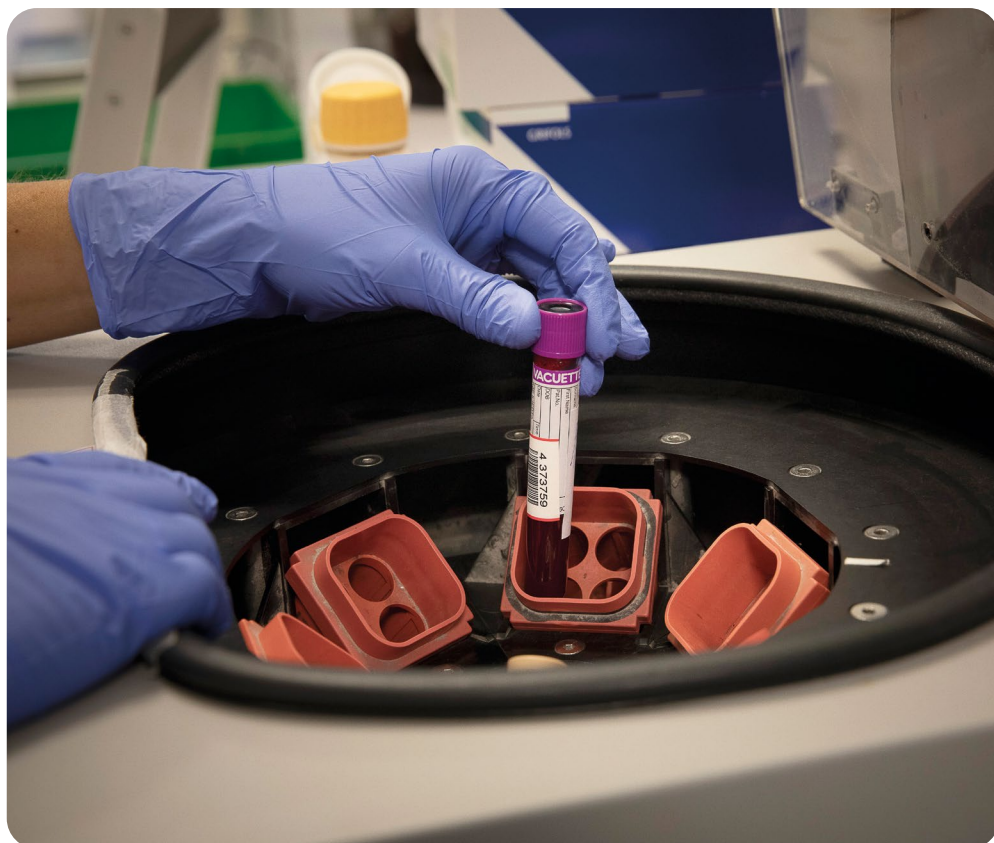
**Principal investigator: Sílvia Sauleda Oliveras**

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 – 2024

## 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 – 2023



## Publications

- Costafreda MI, Sauleda S,** Riveiro-Barciela M, **Rico A,** Llorens-Revull M, Guix S, Pintó RM, Bosch A, Rodríguez-Frías F, Rando A, **Piron M, Bes M.** Specific Plasma MicroRNA Signatures Underlying the Clinical Outcomes of Hepatitis E Virus Infection. *MICROBIOL SPECTR* 2023 Jan 25:e0466422. doi: 10.1128/spectrum.04664-22. PMID: 36695578. IF 3.7. Q2.
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## 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 (BST) 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 PromethION P2 third-generation sequencing (TGS) platforms, which enable ultra-long reads and are being implemented in different areas of interest to the BST. 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, Thermalcyclers, 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. The functions of the platform consist in the management and optimization of the use of NGS and TGS technology. Moreover, the platform provides technical support to researchers who want to use these genomic techniques in the design and development of projects, in the execution and analysis of data. In this sense, it is essential to support the projects from the initial stages to determine the most suitable strategy that allows the achievement of the objectives.

#### Director

Irene Corrales Insa

#### Researchers

Nina Borràs Agustí

Natàlia Comes Fernandez

Carlos Hobeich Naya

Francisco Vidal Pérez



### 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

Margarida Codinach Creus

#### 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 García  
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, Scientific Director 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**

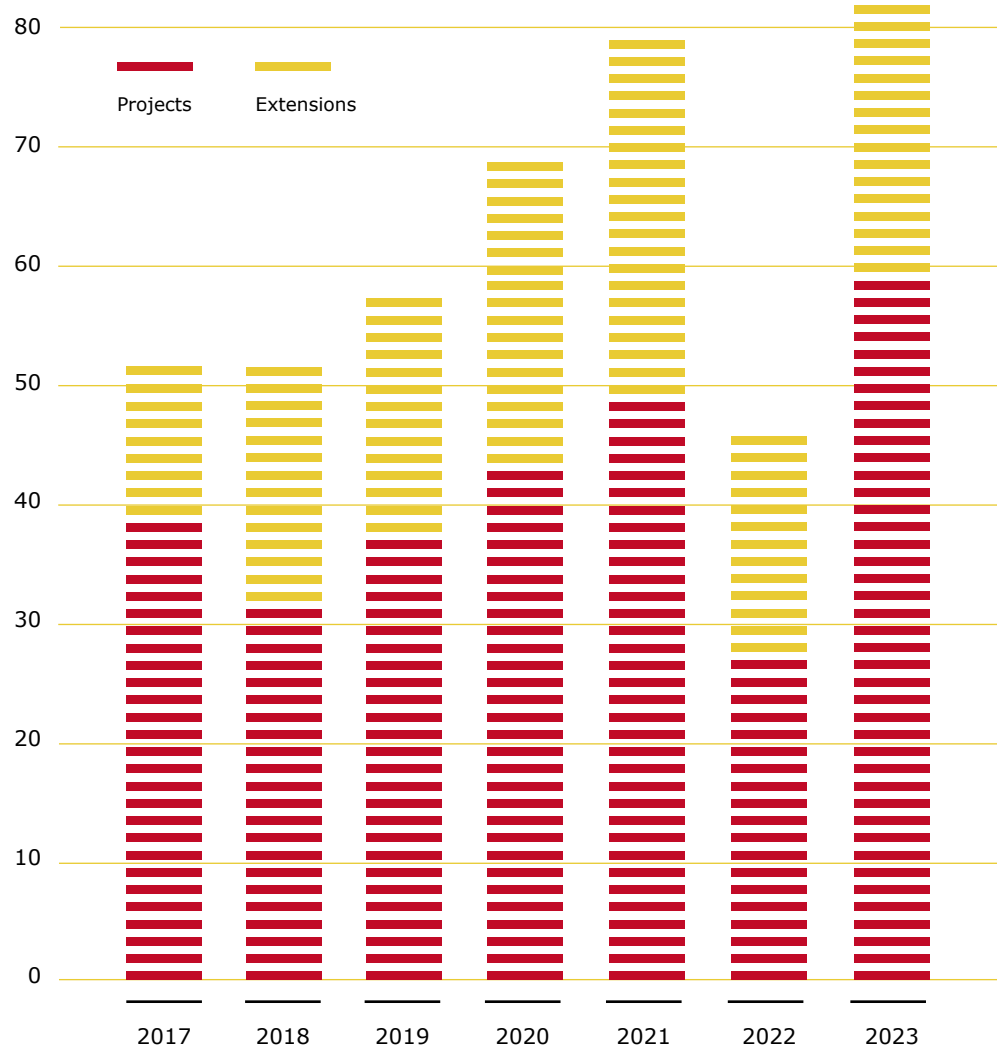




## Active projects

Fifty-nine new projects have been approved for sample assignment and another twenty-two projects have had approval extended.

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



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

**94,991**  
samples  
were  
supplied

<b>BLOOD COMPONENT PROCESSING LABORATORY</b>	<b>TRANSFUSION SAFETY LABORATORY</b>	<b>CELLULAR LABORATORY</b>	<b>HLA LABORATORY</b>
<b>2,550</b>	<b>89,825</b>	<b>2</b>	<b>71</b>
<b>CELL THERAPY SERVICE</b>	<b>BST TISSUE BANK</b>	<b>MILK BANK</b>	<b>TERRITORIAL CENTRES</b>
<b>429</b>	<b>135</b>	<b>10</b>	<b>1,969</b>

## Collaboration agreements

During 2023, twenty MTA's and four extensions of previous agreements have been signed with the following entities:

### MTA's:

Vall Hebron Institut de Recerca, Institut de Recerca Biomèdica, Institut Nacional de Toxicologia i Ciències Forenses, Fundació para la Investigació Biomèdica del Hospital Gregorio Marañón, Hospital Universitari de Zúric, Bioliquid, Integra TX, One Chain, Cell Easy, SAS, The Art of Discovery, SL, Orikine Bio, Antonio Puig, SA, Rejuversen Europe, SLU, Almirall, SA, University of Edinburg, IPBLM-CSIC de Granada, Emercell, Fundació Institut Germans Trias i Pujol, Fundació Privada Món Clínic, Institut de Bioenginyeria de Catalunya

### Extensions:

Institut d'Investigació i Innovació Parc Taulí, Vall d'Hebron Institut d'Oncologia, Universitat de Barcelona, Fundació Institut Hospital del Mar d'Investigacions Mèdiques

### ECONOMIC ACTIVITY

During 2023 the Biobank has invoiced 317.890.79 €



# 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 2023 report, aimed at different profile groups:

## 4.1.

### Students from other institutions

#### 4.1.1. Schools and centres

This 2023 we signed specific agreements with the following schools and vocational training centres:

- Institut Escola del Treball
- Jesuïtes del Clot
- Escola Santa Maria dels Apòstols
- Escola Pia Nostra Senyora
- Institut la Guineueta
- Institut Roger de Lluria
- Institut les Vinyes
- Institut Rambla Prim
- Institut Castellarnau
- Institut Joviat
- Institut Eugeni d'Ors
- Institut Pedraforca
- Centre d'Estudis Roca
- IFP
- Escola Lexia
- SOC
- Escola Familiar Agrícola
- Camp Joliu
- AF Centre d'Estudis
- Escola Ramon i Cajal
- CE Dolmen
- Institut Lacetània
- Institut Alexandre Satorras and Col·legi Sagrada Família.

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

Clinical and Biomedical Laboratory	14
Pathological Anatomy	5
Web application development (bioinformatics)	1
Clinic Electromedicine	3
Health Documentation and Management	2
Administrative Management	1
Organization and management of warehouses	1
Nursing Assistant Care	1

**Seventeen students joined the territorial centres, in the following specialities:**

Clinical and Biomedical Laboratory	14
Sales assistant, office or public service	1
Health Documentation and Management	2

In addition, we welcomed 3 secondary school students.

## 4.1.2. Universities

**Twelve degree students have been tutored at the headquarters—of which 3 have completed their final degree work—from the following universities:**

- Universitat Autònoma de Barcelona (UAB): Faculties of Biology (2) and Biotechnology (1)
- Universitat Pompeu Fabra (UPF): Faculties of Biology (6) and Medicine (1)
- Universitat de Vic - Universitat Central de Catalunya (UVic-UCC): Facultie of Biotechnology (1)
- Universitat Blanquerna: Faculty of Pharmacy (1)

**The departments involved in this practical training are:**

- Cellular Laboratory: 3
- Quality Department: 1
- Microbiology Laboratory: 5
- Immunohematology Laboratory: 2
- Breast Milk Bank: 1

**And three master's students from:**

- UPF. Master Lab. Clinical Analyzes
- UB-UAB. Advanced Immunology Master
- CEU San Pablo. Master in Regenerative Medicine and Advanced Therapy

**Where the departments involved are:**

- Microbiology Laboratory (1)
- Cell and Advanced Therapy Service (2)

**The practices of forty-nine nursing degree students from the following Universities have been tutored at the territorial centers:**

- University of Manresa
- Escola Universitaria Gimbernat
- EUI Terrassa
- UVIC
- EUI Sant Pau and Blanquerna University

**The students are distributed as follows:**

- BST-Badalona: 12
- BST-Bellvitge: 9
- BST-Sant Pau: 7
- BST-Tarragona: 2
- BST-Terrassa: 8
- BST-Girona: 2
- BST-Vall d'Hebron: 9

## 4.2.

## Medical residents

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

In 2023, the BST headquarters trained 21 medical residents in the specialty of Hematology and Haemotherapy; they came from hospitals in Catalonia, other autonomous communities (2) and other specialties (9).

The hospitals of origin of the MIRs in Catalonia are as follows:

### Origin MIR Catalunya

Hospital del Mar	1
Hospital Joan XXIII	1
Hospital Arnau de Vilanova	2
Hospital Clínic	4
Hospital Josep Trueta	2
Hospital Sant Pau	3
Hospital Bellvitge	2
Mútua Terrassa	1
Hospital GTIP	3
Hospital Vall d'Hebron	2

Residents rotate through the following departments:

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

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.

Dr. Jesús Fernández is the coordinator and responsible for these evaluations.

## 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:

- Breastfeeding and Human Milk Donation program with 23 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.

- Fifth edition of the University Master's Degree in Transfusion Medicine and Cellular and Tissue Therapies, in which 24 students from all over enrolled.

Coordinated by Joaquim Vives Armengol (Universitat Autònoma de Barcelona) and Jaap Jan Zwaginga (Leiden University Medical Center).

## 4.4.

### Lifelong learning

During 2023, fourteen professionals from different backgrounds have had a training stay at the BST headquarters. To highlight: H.U. Alexandrovska (Bulgaria), FIMABIS (Málaga), DTI, Grifols Institute, Chulalongkorn University, U.N. Autonomous of Mexico, H. Italiano of Buenos Aires, and Kariadi Hospital (Indonesia).

The departments involved are the Cellular and Advanced Therapy Service, the Histocompatibility and Immunogenetics, Congenital Coagulopathies, Immunohematology Laboratories, the Tissue Bank and the Breast Milk Bank.

## 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 2023 were funded by the following institutions

