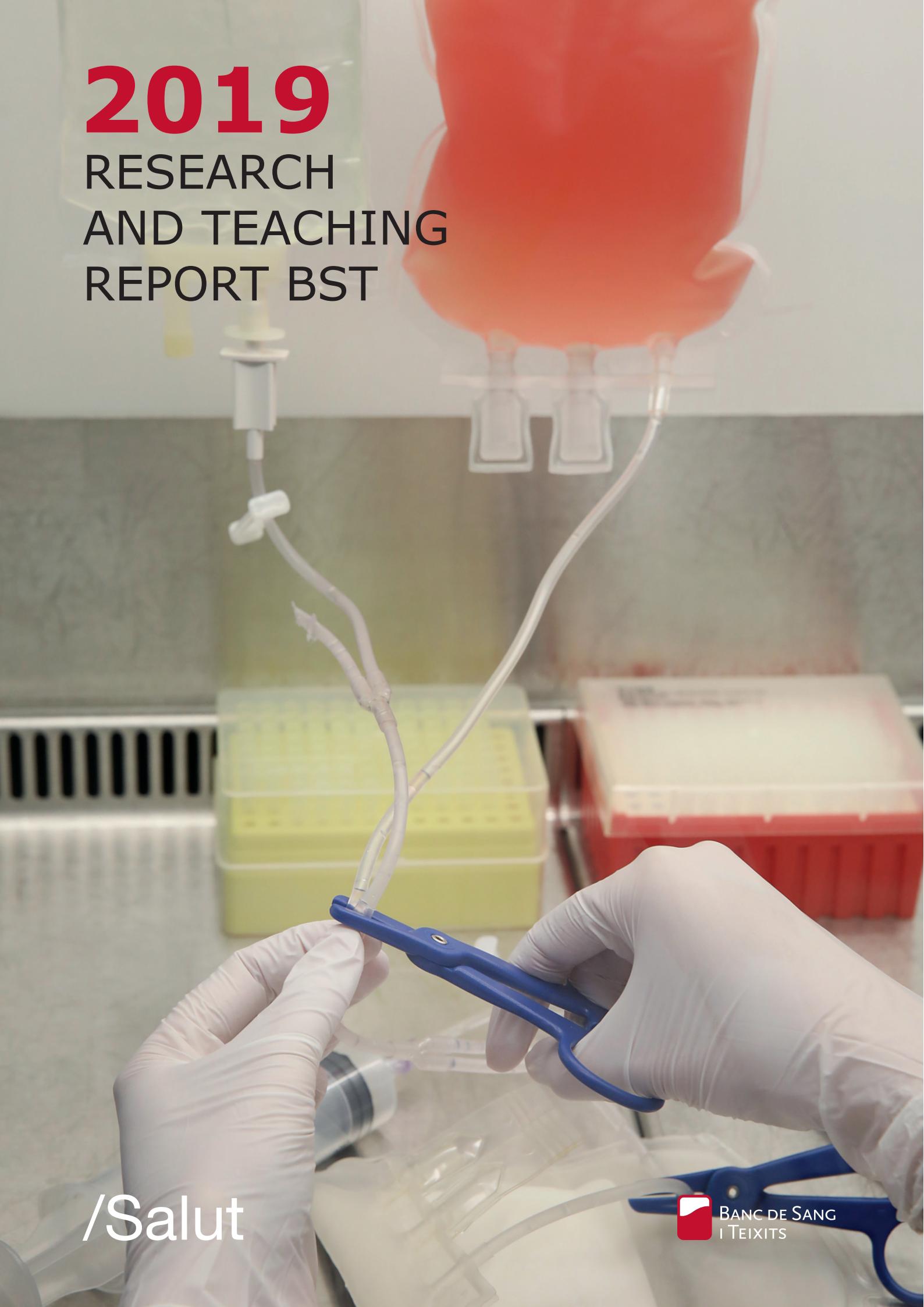

2019
RESEARCH AND TEACHING REPORT BST

/Salut

Banc de Sang i Teixits

2019

RESEARCH AND TEACHING REPORT BST

/Salut

Banc de Sang i Teixits

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2. Activitat investigadora del BST 30

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Enric Argelagués Vidal
General Director

Presentation by the general director

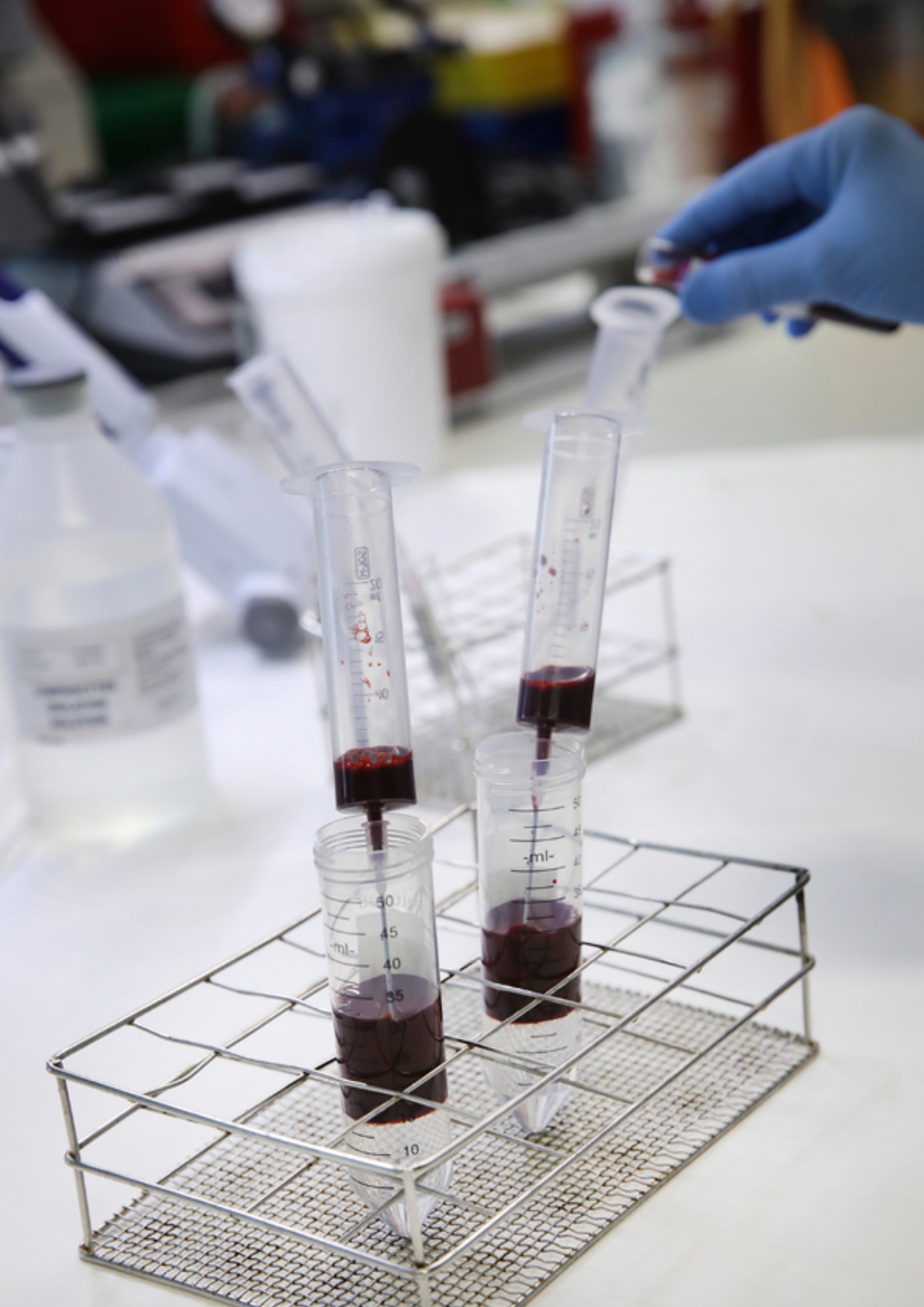
We present the 2019 Research and Teaching Report, which collects the scientific activity of the year that we have left behind. We publish this report in full shock by Covid19 and despite the severity of the pandemic, which has forced us to adapt resources to also address research and knowledge in the best possible way, to stop the virus.

Focusing on 2019, it should be noted that we have completed the third year of the Strategic Research and Innovation Plan, which has focused on the strategic lines that we define as a priority: hemotherapy, donation, biological safety, tissue bank and cell therapy. It has been the year in which we have prepared ourselves to be able to develop the first CAR-T in collaboration with hospitals and we have become a general platform for this therapy. We have allocated more than 2.5 million euros to research, of which 2 million have been our own funds and for internal projects in the five areas proposed.

The knowledge of professionals has resulted in an increase in scientific publications, which have reached 40 and with an impact factor of 174, which is the highest level we have ever achieved. The evolution of scientific production in recent years follows an always upward path and also the classification of publications by professionals.

As director of the Blood Bank, it is a great satisfaction to lead a team of people who, beyond their daily activity, undertake the challenge of promoting and / or actively participating in research year after year, always with an eye on patients who can receive better therapies for their treatments.

Enric Argelagués Vidal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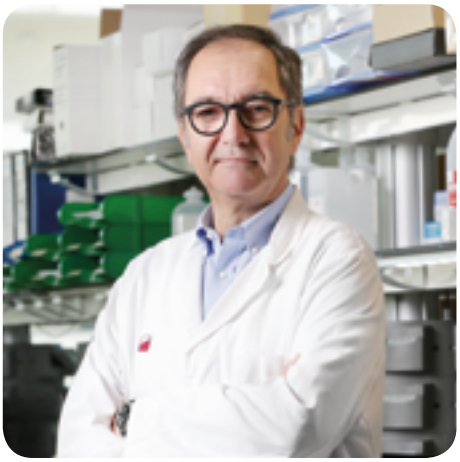


Joan Garcia
Director Científic

Presentation by the scientific director

We are once again pleased to present the Research and Education report for 2019.

This has been the third year of the execution of the Strategic Research Plan (SRP) 2017-2020. We have surpassed its halfway point within an ever-changing environment.

As a result, now midway through, we have decided to look back on it all and, whenever necessary, we have made changes to the course. We will probably see the effects at the end of this cycle.

As you can see on the following pages, it can be said that the SRP is progressing well. The BST remains determined in its commitment to research, maintaining its economic and structural support, which surely explains the noticeable improvement in our competitiveness. It has thus increased the number of projects funded by national and international public calls, significantly improved the number of scientific publications and their impact, and moreover, three doctoral theses have been generated.

As you can see, we have also made an effort in this report to highlight the educational activity of the BST in its various facets. It is precisely due to having all information consolidated that the vocation of all BST professionals to transmit their knowledge has been highlighted.

Finally, we must insist that we are proud to be able to present this report and, above all, to acknowledge the effort of all to make it possible.

Joan Garcia

Highlights of 2019

- The Banc de Teixits (Tissue Bank) in its aim to provide therapeutic solutions to unresolved clinical situations, and thanks to its cutting-edge position in the field of regenerative medicine, has developed a matrix of cellular skin tissue with biomechanical properties that will respond to numerous clinical needs in different medical-surgical areas.

  This new tissue, known as the Dermal Matrix, is obtained by decellularisation techniques, meaning that, given the absence of a cellular component, there is practically no risk of producing an immune response in the receptor. Its thickness gives it unique biomechanical properties, which are ideal for the recovery of various soft tissues of the body.

  Thanks to the internal call for research projects, it has been possible to develop a new product that is currently already available for clinical use. The Dermal Matrix thus emerges as a versatile tissue with possibilities in multiple therapeutic niches.

- The BST-VHIR musculoskeletal tissue engineering research team (2017SGR719) has shown in preclinical studies that allogeneic mesenchymal cells have the same ability to generate new bone tissue as autologous ones.

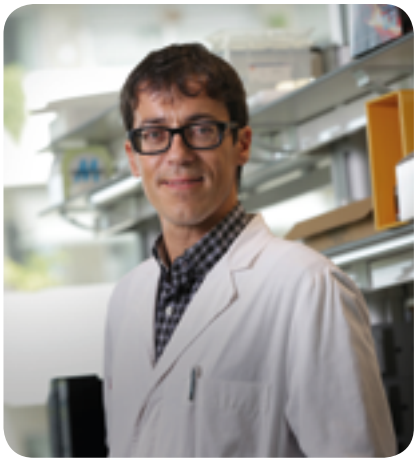
  This is the starting point of the PI19/01788 project granted by the Carlos III Institute of Health that will lead to the formulation of a tissue engineering product based on Wharton Jelly mesenchymal cells that patients will find at their disposal from 2023 onwards.

Marisa Pérez

Antoni Bayés

- After more than a year's preparation, the PERICORD clinical trial, the product of the collaboration between the BST and the ICREC (Hospital Trias i Pujol), has begun. It constitutes the first international application of this thoroughly innovative tissue engineering product.
- Advancing towards the expansion of the uses of umbilical cord blood:
  - The validation of the selection of hematopoietic progenitors from the cryopreserved umbilical cord blood units of homozygous donors for the future IPSC bank, IPS-PANIA, has been completed.
  - Encouraging clinical results of the cord blood platelet "smoothing" eye drops have been obtained.
  - The most frequent alleles and haplotypes in the Barcelona cord blood bank have been published.
- In the field of Immunotherapy:
  - The beginning of the BST-LT-01 Clinical Trial (Viro-T-cel) for the treatment of post-TPH CMV infection.
  - We are participating in 4 new industry CAR-T clinical trials.

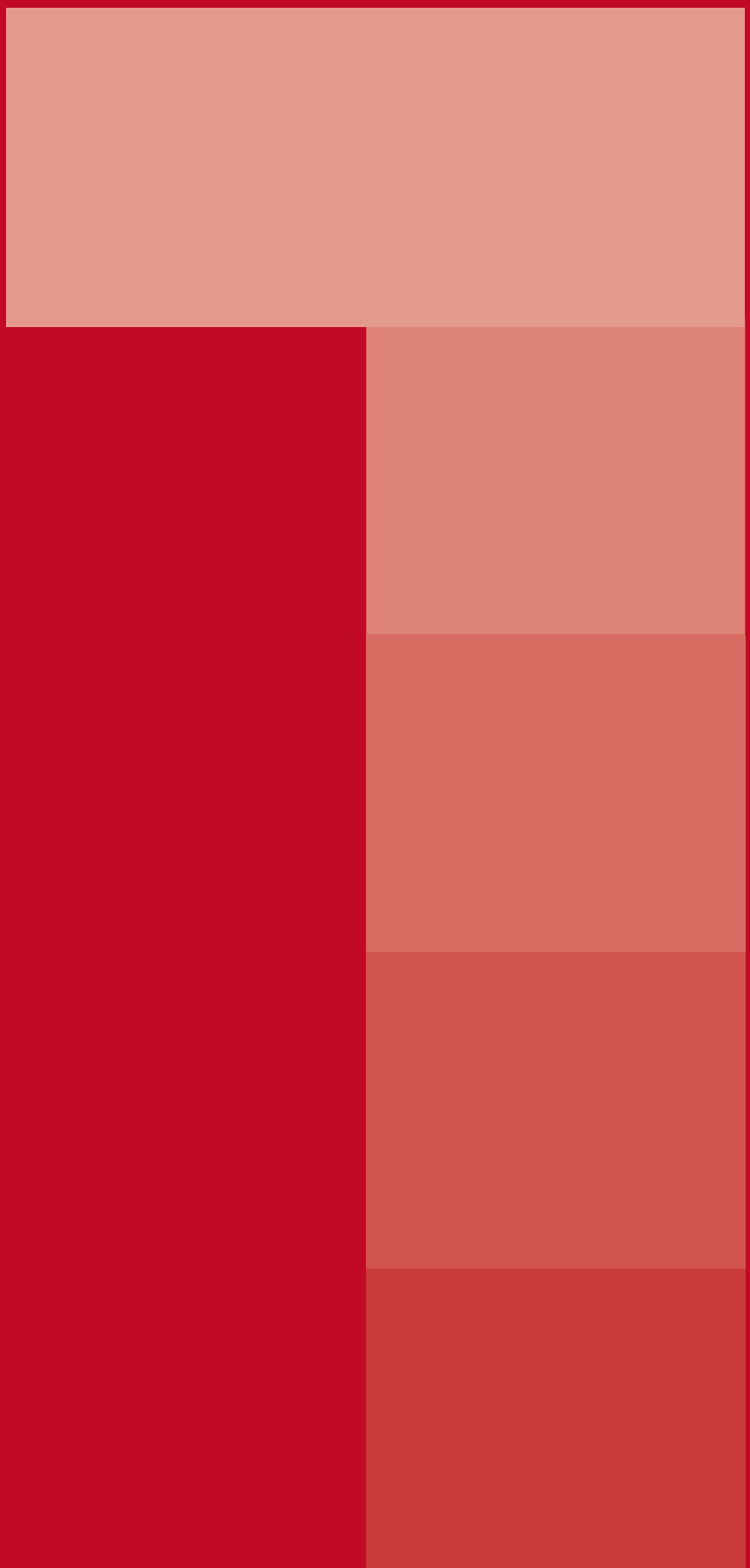
Joaquim Vives



Dinara Samarkanova

Sergi Querol

Banc de sang i teixits



Banc de Sang i Teixits

The Banc de Sang i Teixits (Blood and Tissue Bank) is the public company of the Department of Health whose mission it is to guarantee the supply of sufficient quality blood 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 the State, with a service of proximity to both donors and customers.
- Its intention 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 or works in collaboration with all the centres of the Catalan Health Institute, with many of those of the Hospital Network for Public Use and with Catalan universities, as well as promoting strategic alliances with centres, researchers and with industry.

1.1. Governing Bodies

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

1.1.1. Board of Directors

Chairperson
Manel Peiró Posadas

Secretary
Rafael Gomáriz Parra

Members
Antoni Castells Garagou,
Enric Contreras Barbeta,
Francesc Gòdia Casablancas,
Miquel Rutllant Bañeras,
Emili Sullà Pascual,
Ivan Planas Miret
Roberto Gili Palacios

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1.1.2. Committees of the Board of Directors

Economic and Audit Committee
Ivan Planas Miret
Emili Sullà Pascual

R+D+i Commitee
Francesc Gòdia Casablancas
Roberto Gili Palacios
Miquel Rullant Bañeres

Tissue Strategy Commitee
Antoni Castells Garagou,
Anna Vilarrodona Serrat,
Francesc Gòdia Casablancas.

1.2. Executive and Management Bodies

1.2.1. Executive Committee

General Director
Enric Argelagués Vidal

Deputy Director
Isabel López Asión

Director of People and Values
Esther Solà Saplana

Director of Communication and Donation
Aurora Masip Treig

Health Care Director
Lluís Puig Rovira

Director of Information Technologies
Antoni Masi Roig

Director of Hospital Services
Enric Contreras Barbeta

Director of the Tissue Bank
Anna Vilarrodona Serrat

Director of Operations
Joan Ovejo Cortés

Director of Advanced Therapy Development
Joaquim Delgadillo Duarte

Director of the International Division
Joan Ramon Grífols Ronda

R+D+i Director
Joan Garcia Lopez

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 bearing on the promotion and development of R+D+i are carried out.

The tasks performed by this committee include:

- Reviewing R+D+i policy and ensuring that it be disseminated and known.
- Coordinating the deployment of the Strategic Research Plan (SRP) and evaluating its degree of success.
- Ensuring that the annual R+D+i 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 the progress of projects (anticipating deviations and problems).
- Reviewing the systematics of the process for continuous improvement.

Composition

Scientific Director
Joan Garcia Lopez

Research Programmes Coordinators
Sílvia Sauleda Oliveras,
Aurora Masip Treig,
Eduard Muñiz Díaz,
Sergi Querol Giner,
Ricardo Casaroli Marano

Representative of the territorial centres
Enric Contreras Barbeta

Management representative
Isabel López Asión

Chairperson of the External Scientific Committee
Alejandro Madrigal

Research and Education
Ruth Coll Bonet
Miriam Requena Montero
Elisabet Tahull Navarro

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1.3.2. External Scientific Committee

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

- Annually evaluating the R+D+i 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 ...).
- 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 (president)
Scientific Director of the Anthony Nolan Research Institute, Londres (UK)

Prof. Catherine Bollard
Director of the Center for Cancer and Immunology Research at the Children's Research Institute, Washington (USA)

Prof. Antony Atala
Director of the Wake Forest Institute for Regenerative Medicine (USA)

Prof. Masja de Haas
Sanquin Research and Dept of Immunohaematology and Blood Transfusion, LUMC, Leiden (Holanda)

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1.4. Location

Pg. del Taulat 106

The corporate headquarters of the Banc de Sang i Teixits is located at the confluence between Passeig del Taulat and Carrer de Lope de Vega, in the 22@ technological district of Barcelona. It is from this headquarters that the various lines of activity and many of the organization's 700 professionals are centralised. The BST also has offices in the main hospitals in Catalonia.

700 professionals

technological district 22@ in the Barcelona

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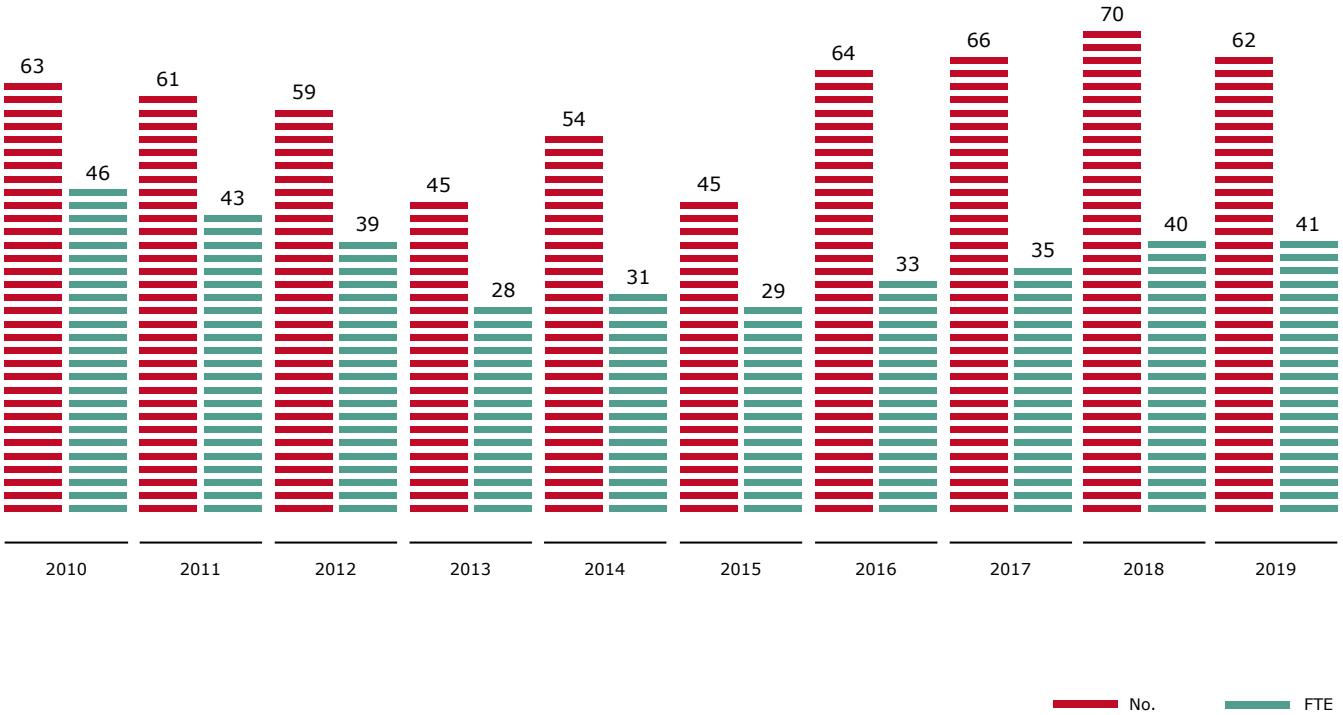
1.5. Summary of research activity

1.5.1. Research and technical staff

Research and technical staff 2019

	No.	FTE	No. of men	FTE of men	No. of women	FTE of women
Lead researchers	6	3.2	5	3.1	1	0.1
Senior researchers	27	19.1	5	1.9	22	17.2
Researchers	22	13.7	6	2.9	16	10.8
Support staff	7	5.5	1	1.0	6	4.5
TOTAL	62	41.5	17	8.9	45	32.6

Evolution of research staff since 2010



1.5.2.
Economic data

Research funding 2019

186,412€

Agreements with industry

2,041,829€

Own funds

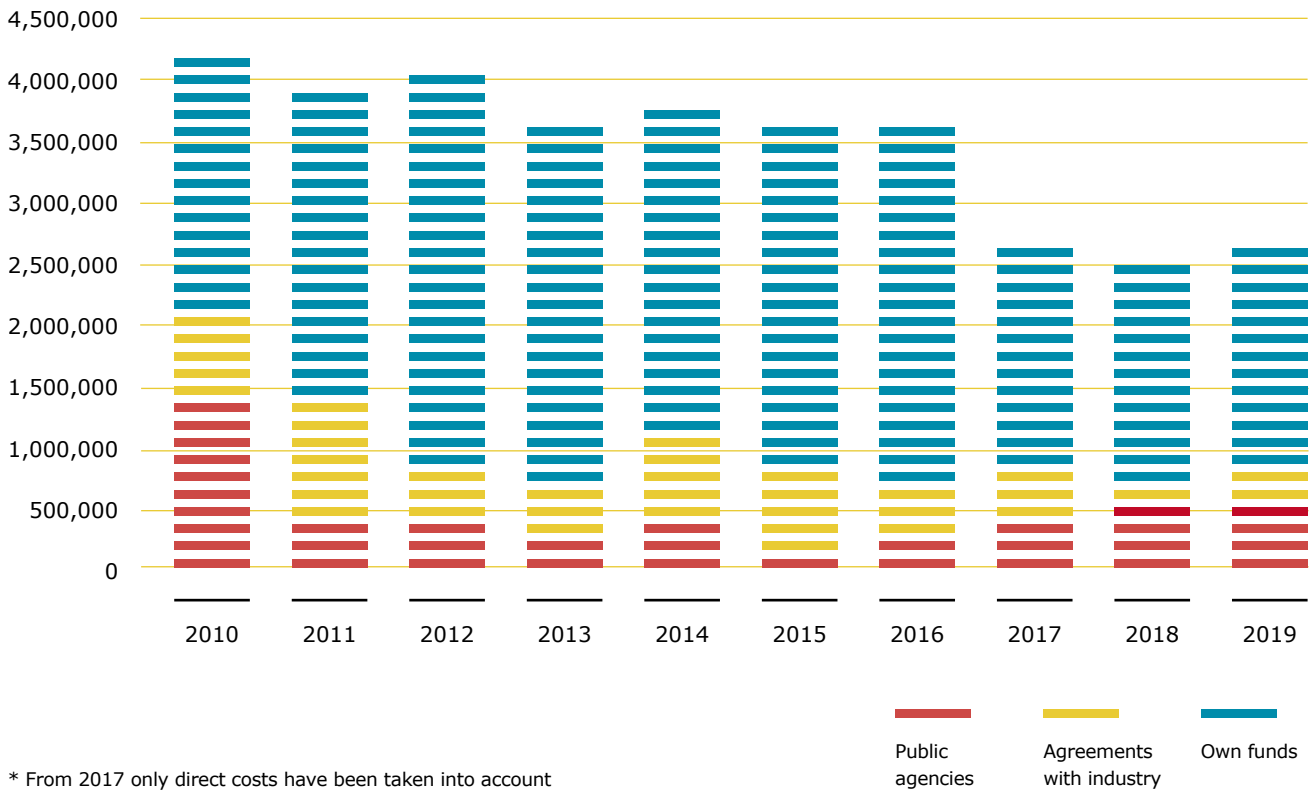
* Includes expenses for full-time or part-time staff and internal research funding

415,102€

Public agencies

Total 2,643,343€

Research income



* From 2017 only direct costs have been taken into account

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1.5.3. Organisation of research at the BST

The Strategic R+D+i Plan 2017-2020 establishes five research programmes

R&D&I 2017-2020

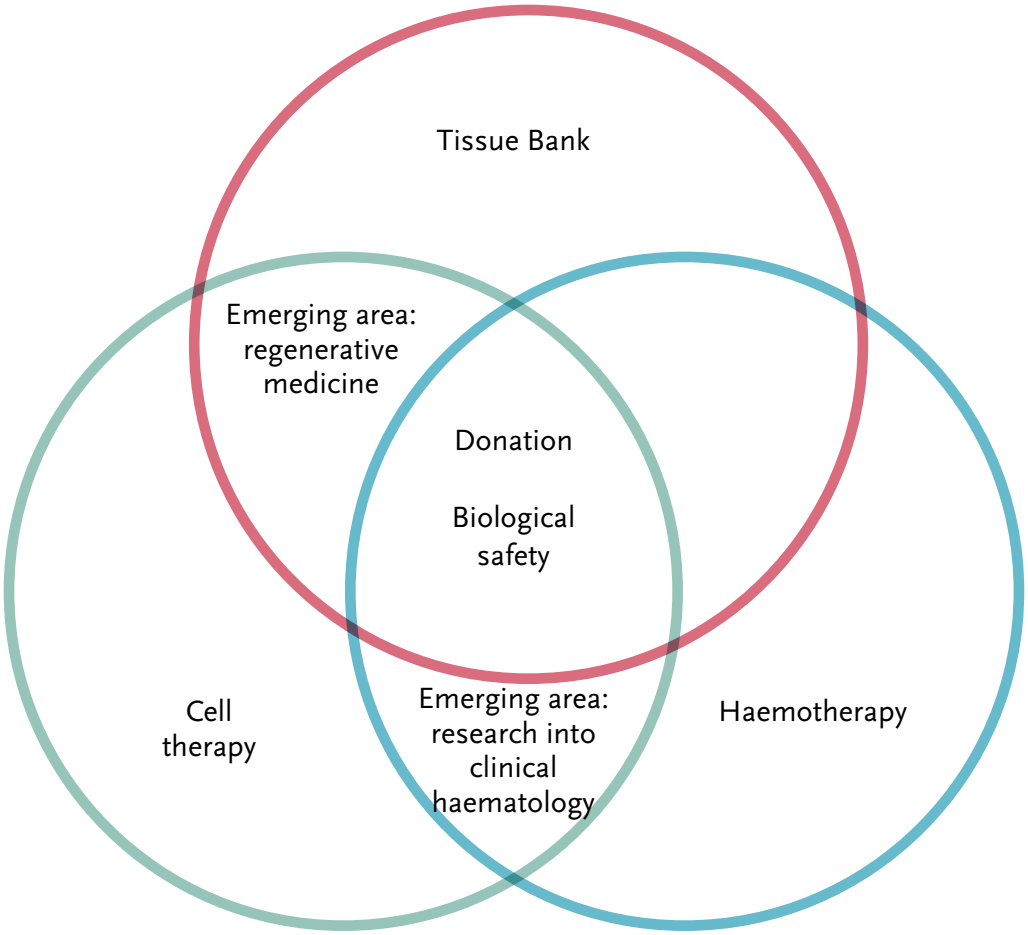
5 Research Programmes

Three core programmes:

- **Haemotherapy:** immunohematology, transfusion, molecular diagnosis, process development (Eduard Muñiz Díaz)
- **Tissue bank:** development of products and processes of the tissue bank, regenerative medicine (Ricardo Casaroli Marano)
- **Cell therapy:** transplant immunobiology/immunotherapy, regenerative medicine (Sergi Querol Giner)

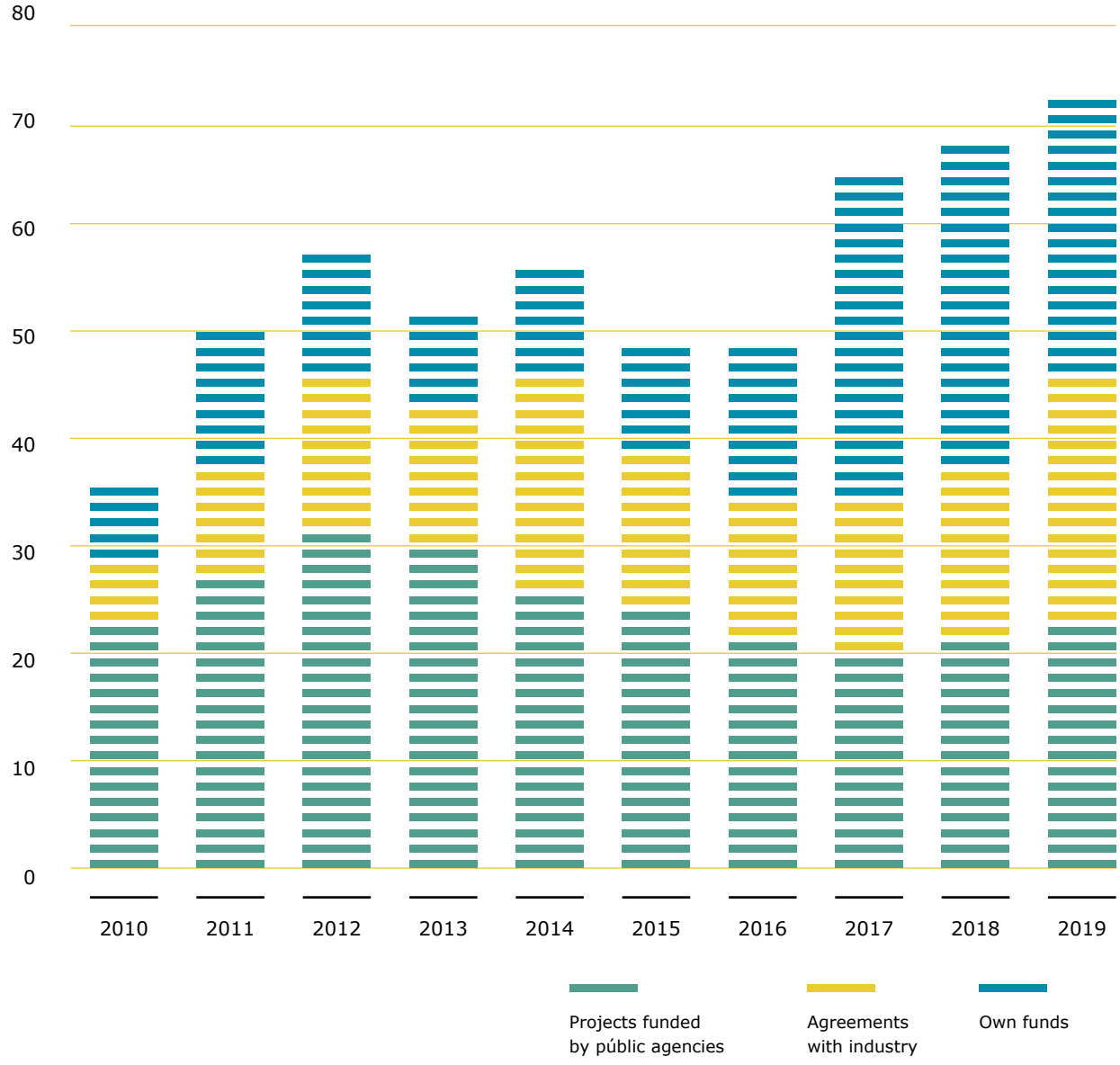
Two transversal programmes:

- **Biological safety:** emerging pathogens, epidemiological studies, harmonisation between products (Sílvia Sauleda Oliveras)
- **Donation of blood, cells and tissues:** study of donation behaviours, donation ethics, donation promotion, protection, well-being and comfort of the donor (Aurora Masip Treig)



1.5.4. Research projects

Research projects



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Active projects during 2019

	BST PRINCIPAL INVESTIGATOR	COLLABORATION
PUBLIC AGENCIES		
European Commission	1	2
Department of Health of the Generalitat	2	
TV3 Marathon Foundation		1
Spanish Multidisciplinary Group in Digestive Cancer		1
Carlos III Institute of Health	4	7
Ministry of Science, Innovation and Universities	4	
Ministry of Health, Consumption and Social Welfare		1
Vall d'Hebron Institute of Oncology		1
AGREEMENTS WITH INDUSTRY		
Achilles		1
Autolus		1
Baxalta	1	
Celgene Corporation		3
Gamida		1
GlaxoSmithKline		1
Grifols, S.A.	1	
Igenomix, S.L.		1
Immucor		1
Kiadis Pharma		1
Kite Pharma, Inc.		1
Lion Biotechnologies, Inc.		3
Merck KGaA		1
Molmed SpA		1
Novartis Farmacéutica, S.A.		5
Sanofi		1
Servier, S.L.		1
OWN FUNDS		**23**
TOTAL		**72**

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1.5.5. Doctoral theses

These were the theses read by BST investigators:

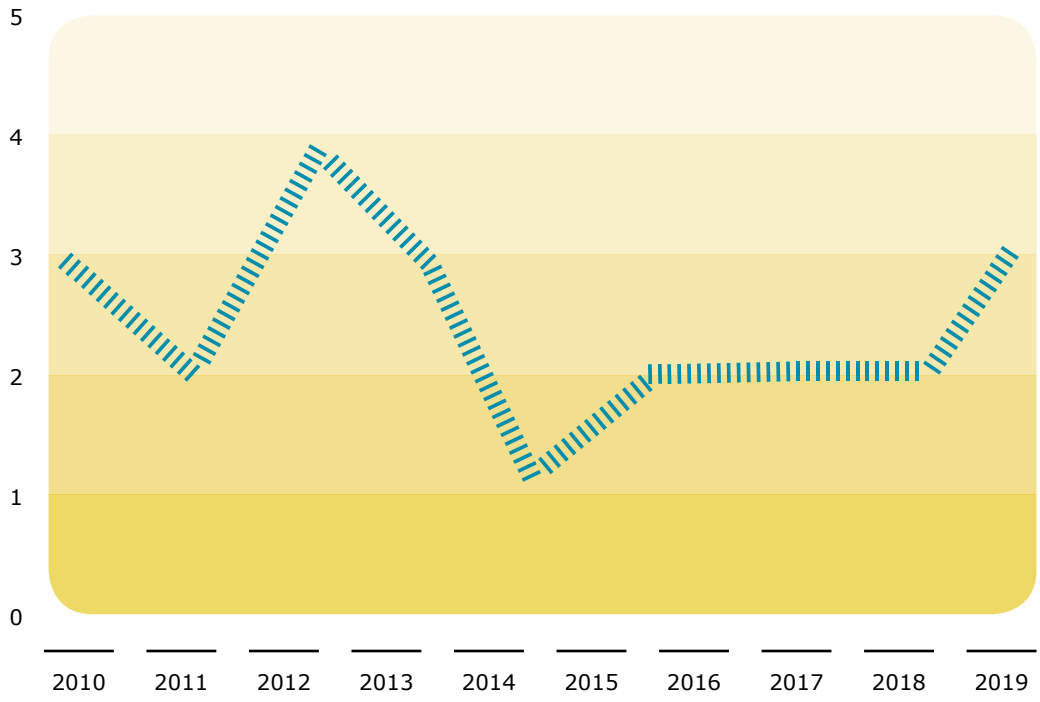
Daniel Chaverri Fierro

Marta Grau Vorster

Emma Enrich Rande

Theses

PHD STUDENT	THESIS TITLE	DIRECTORS
Daniel Chaverri Fierro	TGF-B1 and other molecules as bone consolidation biomarkers in non-hypertrophic pseudoarthrosis of long bones	Joan Minguell Monyart, Joaquim Vives Armengol
Marta Grau Vorster	Development and characterization of advanced cell therapies based on multipotent mesenchymal stromal cells and virus-specific T lymphocytes	Joaquim Vives Armengol, Irene Oliver Vila, Francesc Rudilla Salvador
Emma Enrich Rande	Application of new mass sequencing technologies in the improvement of umbilical cord blood characterization: HLA genes and CCR5-fj32 polymorphism	Francesc Rudilla i Sergi Querol



Evolution of the doctoral theses defended since 2010

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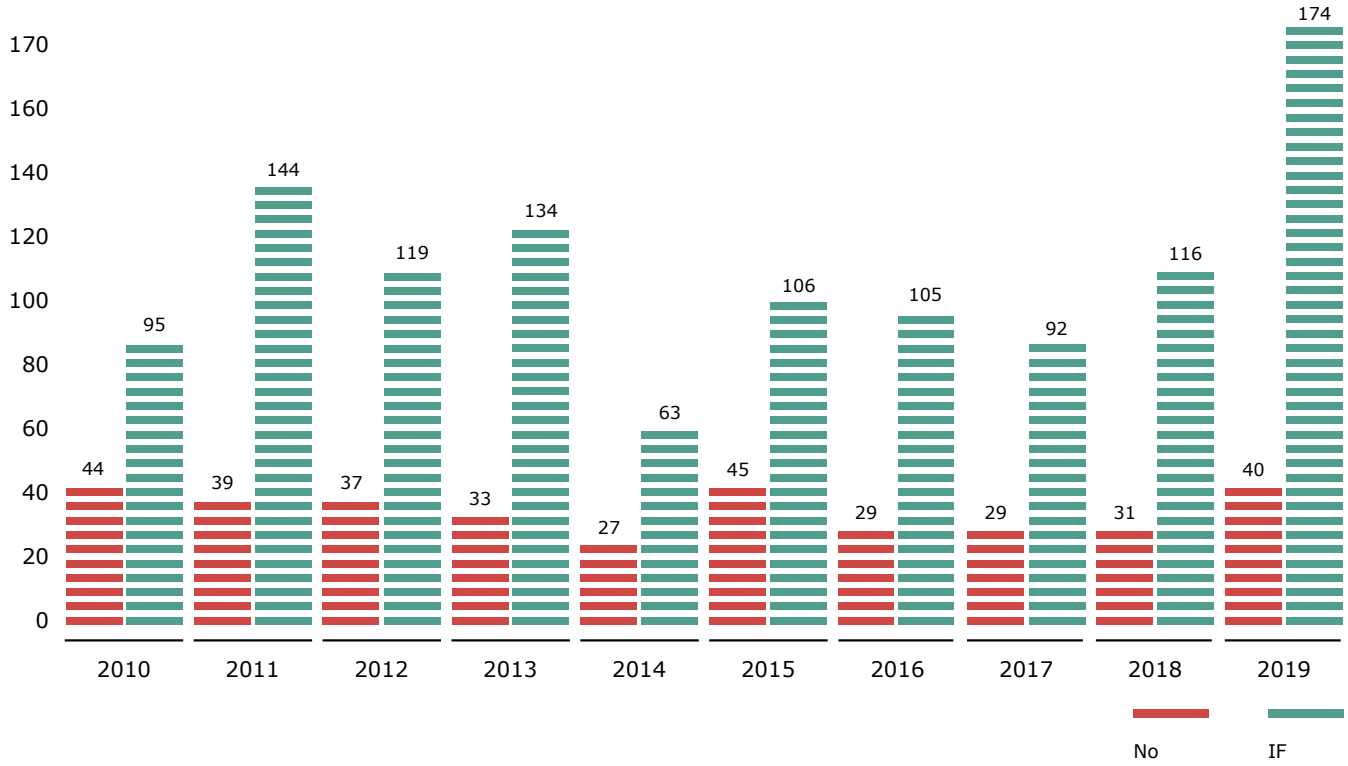
1.5.6. Publications

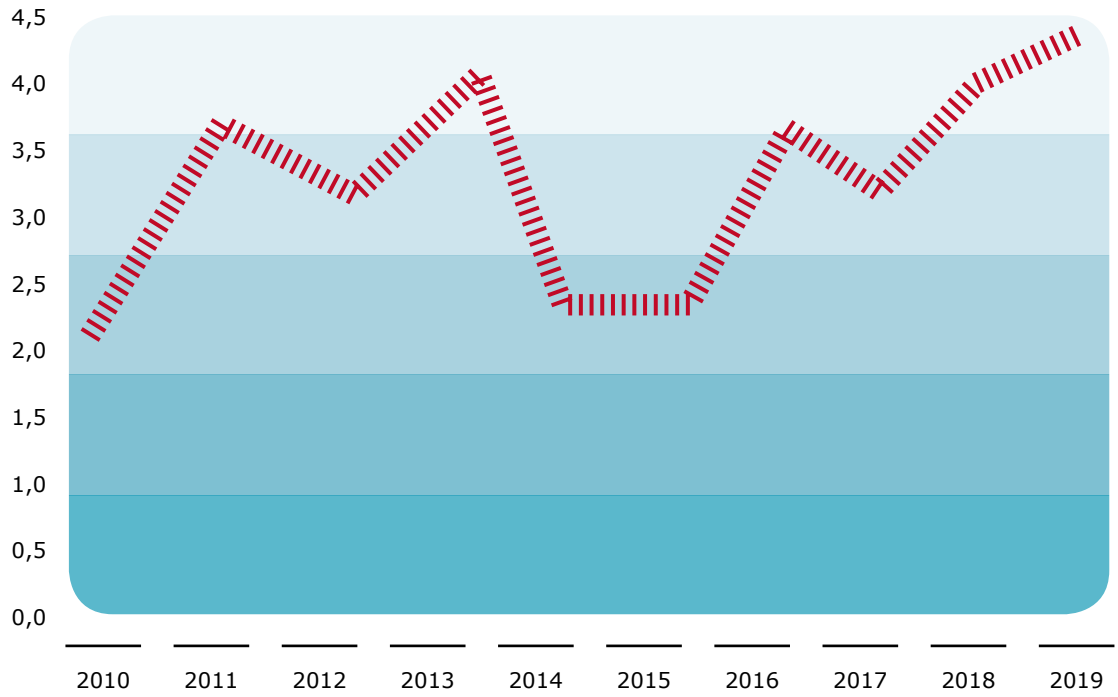
The number of publications in scientific journals by BST researchers in 2019 was 40, with an impact factor of 174. The average impact factor was 4.34. 43% of the articles were published in first quartile journals.

The 2018 *Journal Citation Reports* (JCR) were used to calculate the 2019 impact factor. Original articles, reviews, and editorials were included for the calculation.

Publicacions and Impact factor



Average Impact Factor



Evolution of the BST's scientific production over the last 10 years

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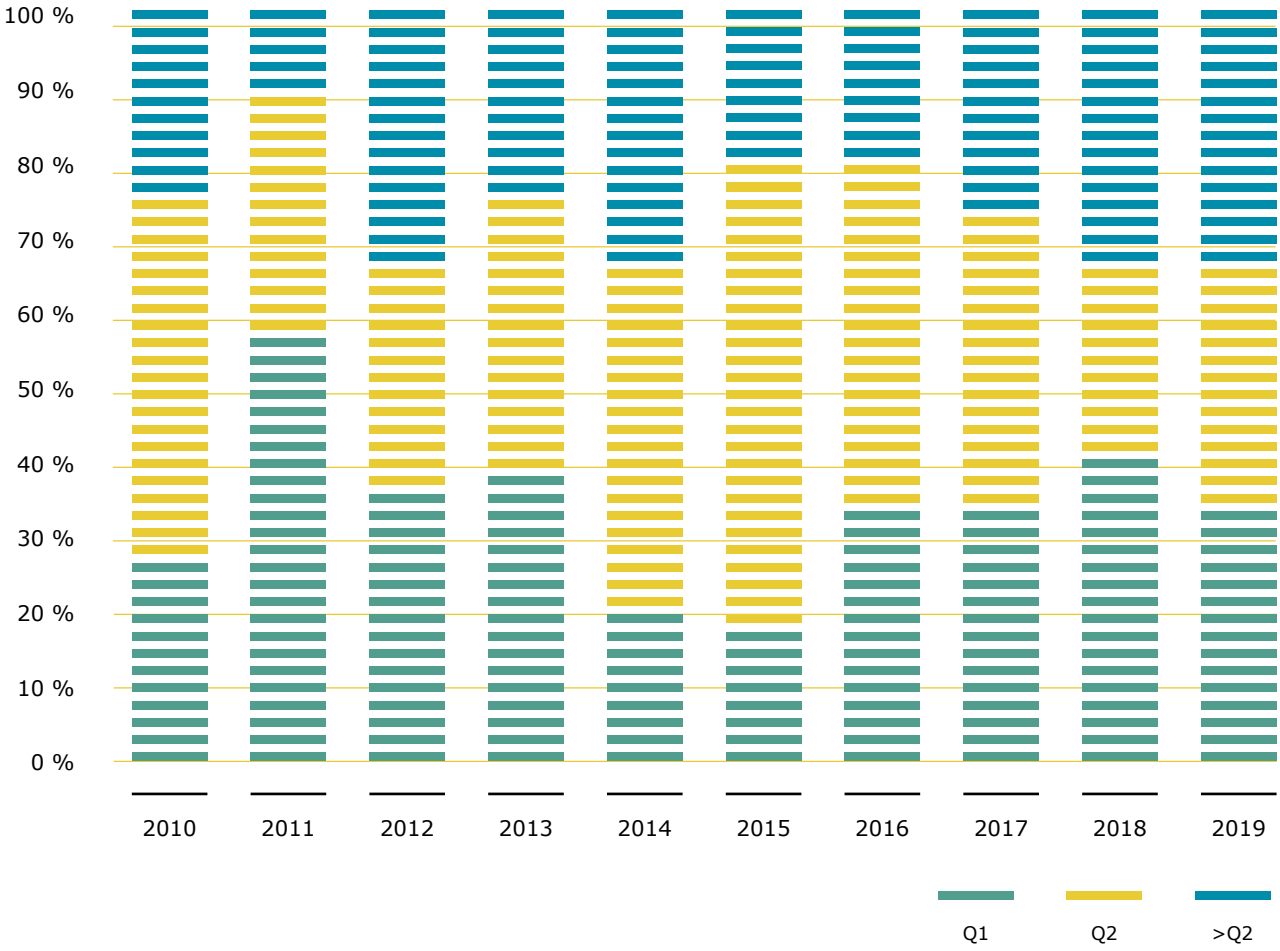
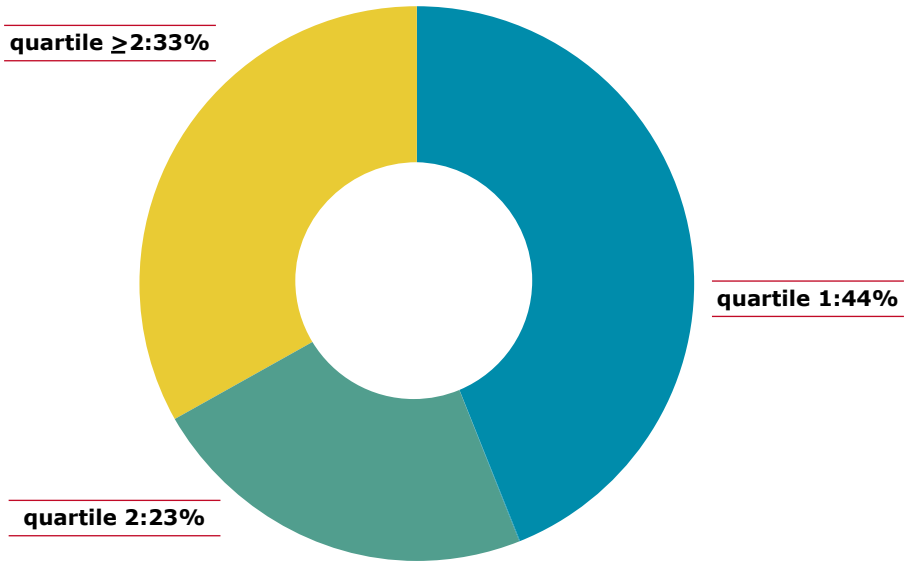
Classification of publications



2019 BST publications by quartiles



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1.5.7. Patents and protection of industrial and intellectual property

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

1.6. Innovation

One of the objectives of the present report is to highlight the ability of BST professionals to innovate by creating new products and services as a result of internal R+D.

In this respect, new products and services have been incorporated in 2019. Moreover, a new parameter, the innovation index, which relates the annual turnover of new products to the global turnover, has been definitively incorporated. The innovation rate achieved is 2.3%.

1.7.

Web

The Banc de Sang i Teixits website

The Banc de Sang i Teixits has two websites: www.bancsang.net and www.donarsang.gencat.cat. Both of them have versions in Catalan, Spanish and English.

The www.bancsang.net page contains information about the entire organization. The contents are structured into the six main theme blocks (corporate information, donors, recipients, professionals, R+D+i, teaching).

It is regularly updated with news and has an application that allows one to manage online orders. It incorporates documentation in PDF format and videos.

The www.donarsang.gencat.cat is aimed at donors and potential blood donors, with the aim of disseminating the donation as an act of altruism, civic commitment and citizen participation.

It provides information on the need to donate blood, its uses and the status of reserves. Moreover, it allows one to search by population or postal code for upcoming mobile donation campaigns. It also includes a news section on blood donation.

In the private area of this website, donors can modify their contact details, consult their donation history and their blood type.

The bancsang.net/blog blog contains information on the corporate, healthcare and scientific activity of the Banc de Sang i Teixits and is aimed at all citizens. It includes an e-newsletter that anyone who wants to receive content updates by email can subscribe to.

The moltesgracies.net blog contains stories of people who needed blood and tissues for their treatment. It includes a form for any recipient to tell their story. In this way, we want to visualise the importance of donations, putting a face to the people who directly benefit from them.

www.bancsang.net
www.donarsang.gencat.cat
www.bancsang.net
bancsang.net/blog
moltesgracies.net

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BST research activity

Research activity of the BST

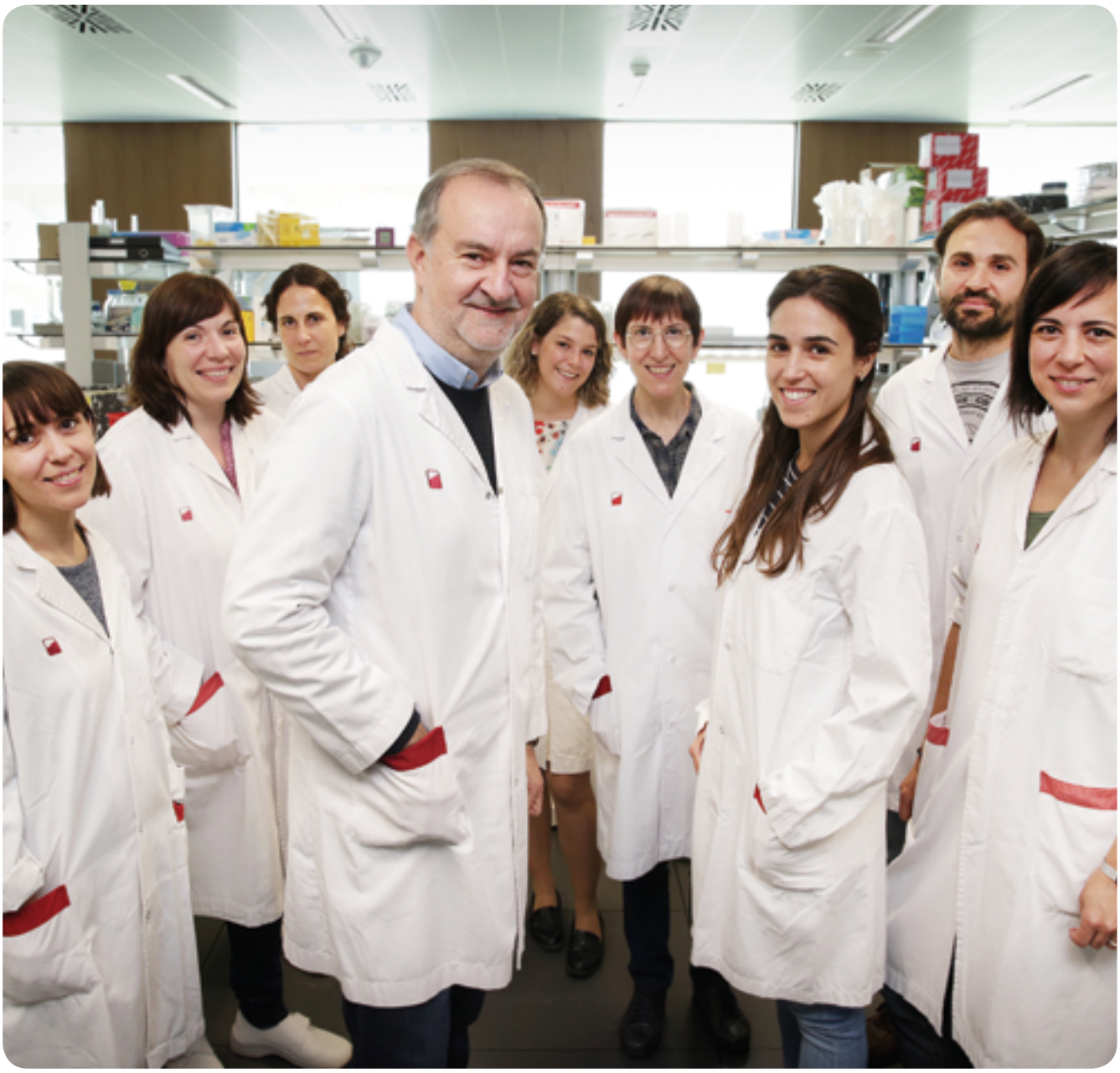
2.1. Haemotherapy programme

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

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

In another respect, it also includes the research and development of diagnostic and decision-making techniques and processes that make transfusions safer, more effective and more efficient.

This program, in addition to its core, is characterised by the simultaneous involvement of central laboratories and territorial centres.



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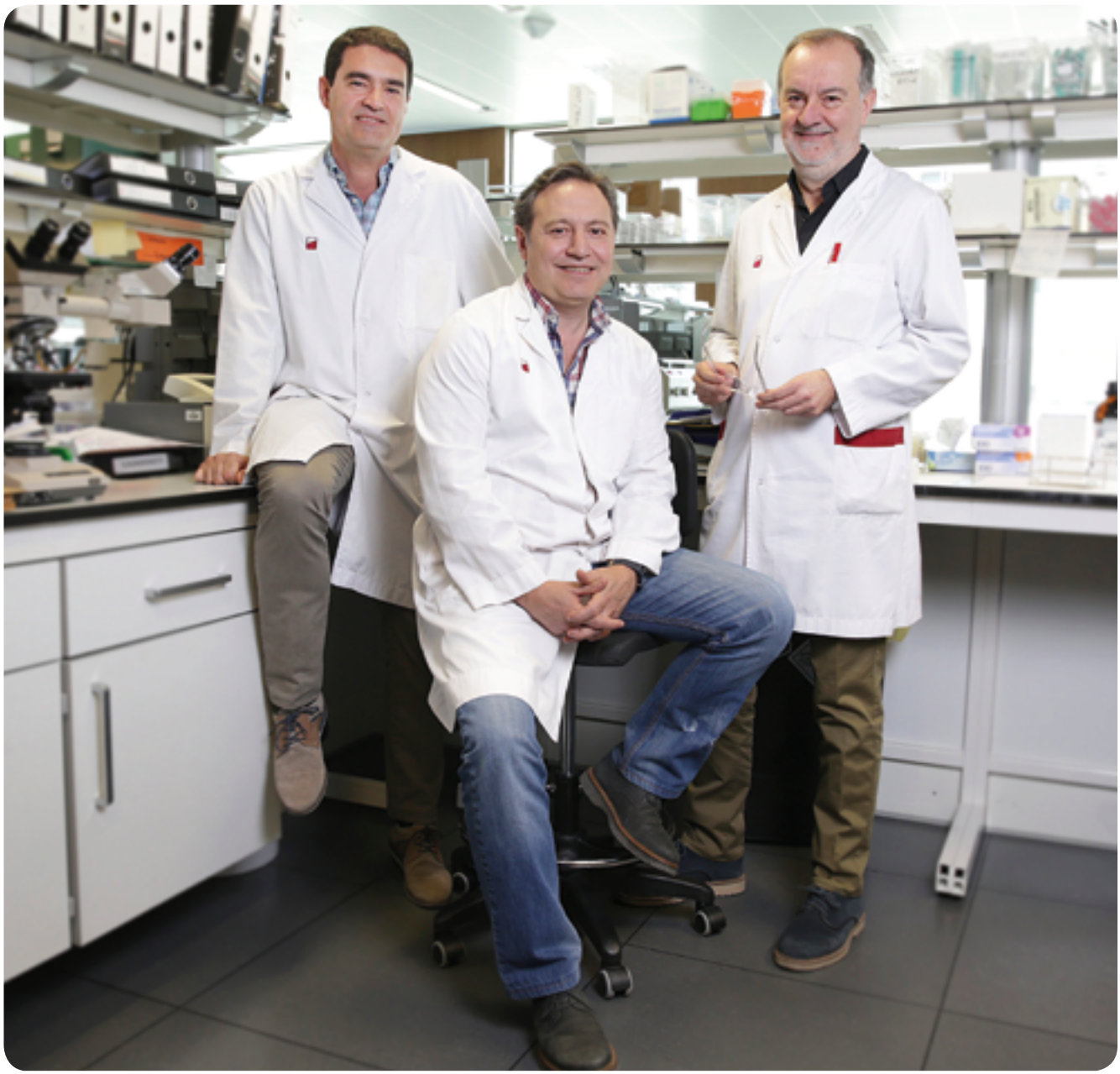
Director
Eduard Muñiz Diaz

Support staff
Natàlia Comes Fernandez
Sergio Huertas Torres
Lorena Ramírez Orihuela

Researchers
Nina Borràs Agustí
Neus Boto Ruiz
Laia Closa Gil
Irene Corrales Insa
Iris Garcia Martinez
Cecilia Gonzalez Santesteban
Carlos Hobeich Naya
Laura Martín Fernández
Laia Miquel Serra
Núria Nogués Gálvez
Maricel Subirà Casellas
Francisco Vidal Pérez
Jordi Vila Bou



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Projects with PI or CO-PI from the BST

Research projects

Principal investigator: Eduard Muñiz Diaz
A phase I/II open-label, multicentre study for evaluating the safety, preliminary efficacy and pharmacokinetics of Isatuximab (SAR650984) in combination with Atezolizumab or Isatuximab alone in patients with advanced malignancies
Funding organisation: Sanofi
File: 2018-000390-67
Duration: 2019

Principal investigator: Eduard Muñiz Diaz
A phase I, open-label dose-finding study on CC-90002, a CD47-targeted monoclonal antibody, in subjects with hematologic cancer and advanced solid tumours
Funding organisation: Celgene
File: I.2018.063
Duration: 2019

Principal investigator: Eduard Muñiz Diaz
An open-label, single-arm, multicentre, phase I/II study of Ruxolitinib added to corticosteroids in paediatric patients with acute grade II-IV EICH following allogeneic hematopoietic stem cell transplantation
Funding organisation: Novartis
File: 2018-000422-55
Duration: 2019

Principal investigator: Eduard Muñiz Diaz
Comparative study of samples from patients treated with CD47
Funding organisation: Immucor
File: I.2018.064
Duration: 2019

Principal investigator: Núria Nogués Gálvez
Development of new blood group genotyping strategies based on NGS technology for application in solving complex immunohaematological problems.
Funding organisation: BST
File: I.2017.053
Duration: 2017 - 2019

Principal investigator: Núria Nogués Gálvez
ID-VITRORED: Obtaining in vitro red blood cells from IPSCs of donors with erythrocyte phenotypes selected and optimised by genomic editing, as an alternative to current red cell panels
Funding organisation: Ministry of Science, Innovation and Universities
File: RTC-2017-6367-1
Duration: 2018 - 2021

Principal investigator: Francisco Vidal Pérez
Addressing inherited haemorrhagic disorders of complex etiology through the application of a common exome sequencing strategy.
Funding organisation: Carlos III Institute of Health
File: PI18/01492
Duration: 2019 – 2021

Principal investigator: Francisco Vidal Pérez
Development and implementation of new massive molecular analysis tools for a comprehensive approach to the diagnosis and research of congenital coagulopathies
Funding organisation: Carlos III Institute of Health
File: PI15/01643
Duration: 2016 - 2019

Principal investigator: Francisco Vidal Pérez
A study of the molecular and clinical profile of VWD: extension of the Spanish VWD cohort (pcm-evw.es) and improvement of the diagnosis through new technologies
Funding organisation: Baxalta
File: H16-32544
Duration: 2016 - 2019

Principal investigator: Francisco Vidal Pérez
Molecular diagnosis of haemophilia in Cuba. Study of genetic variability and population epidemiology.
File: I.2016.023
Funding organisation: BST
Duration: 2016 – 2019

Principal investigator: José Luís Caro Oleas
Development and validation of a protocol for KIR genotyping using NGS technology and its application in different areas of hospital care
Funding organisation: BST
File: I.2017.035
Duration: 2017 - 2019

Principal investigator: Irene Corrales Insa
Research on the molecular basis of haemorrhagic diathesis associated with connective tissue abnormalities by studying the clinical exome with NGS
Funding organisation: BST
File: I.2017.037
Duration: 2017 - 2019

Principal investigator: Eva Alonso Nogués
Invasive procedures with septic patients and applicability of viscoelastic tests to determine the suitability of the previous transfusion of blood components
Funding organisation: BST
File: I.2017.018
Duration: 2017 - 2019

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Principal investigator: Maricel Subirà Casellas
An epidemiological study of blood transfusion in Catalonia – 2018
Funding organisation: BST
File: I.2018.029
Duration: 2018 - 2019

Principal investigator: Jordi Vila Bou
A study on the effects of the transfusion of red blood cell concentrates, tranexamic acid and fibrinogen concentrate for the treatment of haemorrhage secondary to severe trauma during the prehospital care phase
Funding organisation: BST
File: 2018-001867-22
Duration: 2018 - 2020

Principal investigator: Anna Bigas Salvans (IMIM), Núria Nogués Gálvez (BST)
Hematopoietic regeneration from pluripotent stem cells
Funding organisation: Department of Health of the Generalitat
File: STL002/16/00299
Duration: 2017 - 2019

Joint projects

Principal investigator: Javier Martínez Picado (IRSICaixa), Joan Ramon Grífols Ronda (BST)
Low viral reservoir in treated patients (LoViReT) - Phase II: predictors of HIV reservoirs - extremely low in patients who have started antiretroviral therapy in the chronic phase of the infection
Funding organisation: Merck KGaA
File: I.2017.016
Duration: 2018 - 2019

Principal investigator: Isabel Sánchez Ortega (ICO Duran i Reynals), Isabel González Medina (BST)
A phase-III, randomised, open-label and multicentre study of ruxolitinib versus the best available therapy in patients with chronic graft-versus-host disease following allogeneic stem cell transplantation.
Funding organisation: Novartis Farmacéutica, S.A.
File: 2016-004432-38
Duration: 2018 - 2019

Principal investigator: Josep Gámez Carbonell (Hospital Vall d'Hebron), José Luís Caro Oleas (BST)
An analysis of genetic susceptibility factors and phenotype modifiers in familial and sporadic forms of autoimmune myasthenia gravis using NGS techniques
Funding organisation: Carlos III Institute of Health
File: PI16/01673
Duration: 2017 - 2019

Principal investigator: Eva Martinez Cáceres (Hospital Germans Trias i Pujol), Joan Ramon Grífols Ronda (BST)
Induction of tolerance with dendritic cells treated with vitamin D3 and loaded with myelin peptides, in patients with multiple sclerosis
Funding organisation: European Commission
File: 779316
Duration: 2017 - 2019

Principal investigator: Pilar Paniagua Iglesias (Hospital de Sant Pau), Alba Bosch Llobet (BST)
An assessment of the degree of performance and clinical impact of mass transfusion protocols
Funding organisation: Carlos III Institute of Health
File: PI16/01134
Duration: 2017 – 2019

Principal investigator: Juan Carlos Souto Andrés (Hospital de Sant Pau), Francisco Vidal Perez (BST)
Involvement of platelet adhesion and related phenotypes, and their genetic determinants, in the risk of VTE. RETROVE 3
Funding organisation: Carlos III Institute of Health
File: PI18/00434
Duration: 2019 – 2021

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Publications

Martorell L, Cortina V, **Parra R**, Barquinero J, **Vidal F.** Variable readthrough responsiveness of nonsense mutations in hemophilia A. HAEMATOLOGICA 2019 Jun 13. QUARTILE 1, IF 7.570

Closa L, **Vidal F**, **Herrero MJ**, **Caro JL.** Distribution of human killer cell immunoglobulin-like receptors and ligands among blood donors of Catalonia. HLA 2019 Nov 7. QUARTILE 2, IF 2.785

Riveiro-Barciela M, Muñoz-Couselo E, **Fernandez-Sojo J**, Diaz-Mejia N, **Parra-López R,** Buti M. Acute Liver Failure Due to Immune-Mediated Hepatitis Successfully Managed With Plasma Exchange: New Settings Call for New Treatment Strategies? J HEPATOL 2019 Mar;70(3):564-566. QUARTILE 1, IF 18.946

Batlle J, Pérez-Rodríguez A, **Corrales I**, **Borràs N**, Costa Pinto J, López-Fernández MF, **Vidal F**; PCM-EVW-ES Investigators Team. Update on Molecular Testing in von Willebrand Disease. SEMIN THROMB HEMOST 2019 Apr 30. QUARTILE 2, IF 3.401

de la Morena-Barrio ME, Salloum-Asfar S, Esteban J, de la Morena-Barrio B, Altisent C, **Martin-Fernandez L**, Gueguen P, Padilla J, Miñano A, **Parra R**, Vicente V1, **Vidal F**, Bauduer F, Carbonell P, Corral J. Archeogenetics of F11 p.Cys38Arg: a 5,400 years old mutation identified in different southwestern European countries. BLOOD 2019 May 1. QUARTILE 1, IF 16.562

De la Morena-Barrio B, **Borràs N**, Rodríguez-Alén A, de la Morena-Barrio ME, García-Hernández JL, Padilla J, Bravo-Pérez C, Miñano A, Rollón N, Corral J, **Vidal F**, Vicente V. Identification of the first large intronic deletion responsible of type I antithrombin deficiency not detected by routine molecular diagnostic methods. BR J HAEMATOL 2019 Apr 2. QUARTILE 1, IF 5.206

Trucco Boggione C, **Nogués N**, **González-Santesteban C**, Mufarrege N, Luján Brajovich M, Mattaloni SM, Leri M, Biondi C, **Muñiz-Diaz E**, Castilho L, Cotorruelo C. Characterization of RHD locus polymorphism in D negative and D variant donors from Northwestern Argentina. TRANSFUSION 2019 Sep 10. QUARTILE 2, IF 3.111

Sánchez-Durán MÁ, Higueras MT, Halajdian-Madrid C, Avilés García M, Bernabeu-García A, Maiz N, **Nogués N**, Carreras E. Management and outcome of pregnancies in women with red cell isoimmunization: a 15-year observational study from a tertiary care university hospital. BMC PREGNANCY CHILDBIRTH 2019 Oct 15;19(1):356. QUARTILE 2, IF 2.413

Clausen FB, Barrett AN; Noninvasive Fetal RHD Genotyping EQA2017 Working Group. Noninvasive fetal RHD genotyping to guide targeted anti-D prophylaxis-an external quality assessment workshop. VOX SANG 2019 May;114(4):386-393. QUARTILE 3, IF 2.364

Montero-Martín G, Mallempati KC, Gangavarapu S, Sánchez-Gordo F, **Herrero-Mata MJ**, Balas A, Vicario JL, Sánchez-García F, González-Escribano MF, Muro M, Moya-Quiles MR, González-Fernández R, Ocejo-Vinyals JG, Marín L, Creary LE, Osoegawa K, Vayntrub T, **Caro-Oleas JL**, Vilches C, Planelles D, Fernández-Viña MA. High-resolution characterization of allelic and haplotypic HLA frequency distribution in a Spanish population using high-throughput next-generation sequencing. HUM IMMUNOL 2019 Jul; 80(7):429-436. QUARTILE 4, IF 2.202

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2.2. Cell therapy programme

The aim is for cell therapy in the BST to constitute a platform for knowledge and cell production for the Catalan healthcare system, with the ambition of providing the appropriate response to the needs of patients and the doctors who treat them.

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

Moreover, the BST wants to scale the products and take on the challenge of bioreactor production, in the development of clinical trials, jointly with the Spanish Medicines Agency, among others.

The Cell Therapy Service has its own two lines of development. One is in cellular immunotherapy, with the intention of creating a bank of specific T-cells against the most prevalent viruses among transplant patients. The other is the use of mesenchymal cells from Wharton's jelly in various applications, such as the treatment of graft-versus-host disease and the induction of osteogenesis.

Director
Sergi Querol Giner

Researchers
Belén Álvarez Palomo
Míriam Aylagas García
Margarita Blanco Garcia
Raquel Cabrera Perez
Ester Cantó Puig
Margarita Codinach Creus
Emma Enrich Rande
Marta Grau Vorster
Alba Lopez Fernandez
Lluís Martorell Cedres
Elena Pasamar Garijó
Luciano Rodríguez Gómez
Raquel Rojas Marquez
Francesc Rudilla Salvador
Dinara Samarkanova
Daniel Vivas Pradillo
Joaquim Vives Armengol

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Research projects

Projects with PI or CO-PI from the BST

Principal investigator: Joan Garcia López
Pericardial matrix with mesenchymal stem cells for the treatment of patients with infarcted myocardial tissue
Funding organisation: Ministry of Science, Innovation and Universities
File: SAF2017-84324-C2-2-R
Duration: 2018 - 2021

Principal investigator: Sergi Querol Giner
iPS-PANIA: Allogeneic IPSCs from homozygous umbilical cord blood units for high-prevalence haplotypes
Funding organisation: Ministry of Science, Innovation and Universities
File: RTC-2017-6000-1
Duration: 2018 - 2021

Principal investigator: Sergi Querol Giner
T-CELBANC: Creation of a national bank of specific T lymphocytes for immediate use in opportunistic post-transplant infections
Funding organisation: Ministry of Science, Innovation and Universities
File: 2017-6368-1
Duration: 2018 - 2021

Principal investigator: Francesc Rudilla Salvador
Generation of virus-specific T-cells to prevent and treat herpesvirus infections after allogeneic hematopoietic stem cell transplantation
Funding organisation: BST
File: I.2018.30
Duration: 2018 - 2021

Principal investigator: Margarita Codinach Creus
Completion of the Development of an Advanced Therapy Medicine for prenatal myelomeningocele repair in humans
Funding organisation: BST
File: I.2017.056
Duration: 2018 - 2019

Principal investigator: Francesc Rudilla Salvador
Use of third-party T-specific lymphocytes against viral antigens, from a volunteer donor registry, for the treatment of CMV, EBV, and ADV infections in allogeneic hematopoietic progenitor cell transplant recipients.
Funding organisation: BST
File: I.2017.042
Duration: 2017 - 2019

Principal investigator: Joaquim Vives Armengol
In vitro study. Grifols Fibrin Sealant as a scaffold in advanced therapies.
3D printed scaffolds for advanced trauma applications
Funding organisation: Grifols, S.A.
File: I.2016.035
Duration: 2017 - 2019

Principal investigator: Ruth Coll Bonet
Safety of a double infusion of Wharton's jelly mesenchymal cells in spinal cord injury
Funding organisation: BST
File: I.2017.052
Duration: 2017 - 2020

Principal investigator: Sergi Querol Giner
A phase I/II, multicentre, randomised, open-label clinical trial of two treatment groups for evaluating the efficacy and safety of umbilical cord blood drops in the treatment of neurotrophic keratitis
Funding organisation: BST
File: I.2016.010
Duration: 2017 - 2019

Principal investigator: Antoni Bayés Genís (Hospital Germans Trias i Pujol), Joaquim Vives Armengol (BST)
Cardiopoiesis with biomatrix for regenerating postinfarction scar: From bench to bedside (first-in-man trial)
Funding organisation: Department of Health of the Generalitat
File: SLT002/16/00234
Duration: 2017 - 2019

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Collaboration projects

Principal investigator: Pere Barba Suñol (Hospital Vall d'Hebron), Rafael Parra Lopez (BST)
A phase II, single-arm, multi-cohort, multicentre trial to evaluate the efficacy and safety of JCAR017 in adult subjects with aggressive B-cell non-Hodgkin lymphoma
Funding organisation: Celgene Corporation
File: 2017-000106-38
Duration: 2018 - 2019

Principal investigator: Elena Elez Fernandez (VHIO), Rafael Parra Lopez (BST)
A single-arm, phase I-II multicentre trial with Avelumab plus an autologous dendritic cell vaccine to determine the safety and preliminary efficacy of the combination in patients with metastatic colorectal cancer
Funding organisation: Spanish Multidisciplinary Group in Digestive Cancer
File: 2016-003838-24
Duration: 2018 - 2019

Principal investigator: Susana Rives Sola (Hospital Sant Joan de Déu), Enric Garcia Rey (BST)
A phase Ib/II, multicentre, open-label, single-arm, multicohort 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 lymphoma
Funding organisation: Celgene Corporation
File: 2018-001246-34
Duration: 2018 - 2019

Principal investigator: Alena Gros Vidal (VHIO), Rafael Parra López (BST)
Non-invasive personalised cell therapies for the treatment of solid tumours
Funding organisation: Vall d'Hebron Hospital Institute of Oncology
File: I.2018.36
Duration: 2018 - 2021

Principal investigator: Anna Sureda Balari (ICO Duran i Reynals), Sergi Querol Giner (BST)
ZUMA 7: A phase III randomised, open-label study for evaluating the efficacy of axicabtagene ciloleucel versus the standard treatment in patients with relapsed/ refractory diffuse large B-cell lymphoma
Funding organisation: Kite Pharma, Inc.
File: 2017-002261-22
Duration: 2018 - 2019

Principal investigator: David Valcárcel Ferreiras (Hospital Vall d'Hebron), Sergi Querol Giner (BST)
Endometrial regeneration in Asherman's syndrome and atrophic endometrium by autologous bone marrow stem cell transplantation
Funding organisation: Igenomix, S.L.
File: I.2017.007
Duration: 2018 – 2019

Principal investigator: Pere Barba Suñol (Hospital Vall d'Hebron), Sergi Querol Giner (BST)
Use of third party specific T lymphocytes against viral antigens, from a register of voluntary donors, for the treatment of CMV, EBV and adenovirus infections in the recipient of an allogeneic hematopoietic cell transplant
Funding organisation: Carlos III Institute of Health
File: PI16/01433
Duration: 2017 - 2019

Principal investigator: Cristina Diaz Heredia (Hospital Vall d'Hebron), Sergi Querol Giner (BST)
FANCOSTEM: A phase I/II clinical trial for evaluating the safety and efficacy of the mobilisation and collection of CD34 cells after treatment with plerixafor and filgastrim in patients with Fanconi anaemia for later use in gene therapy trials
Funding organisation: Ministry of Health, Consumer Affairs and Social Welfare
File: EC11-559
Duration: 2012 - 2019

Principal investigator: Jordi Sierra Gil (Hospital de Sant Pau), Sergi Querol Giner (BST)
TK008: A randomised phase III study of haploidentic haematopoietic cell transplantation with or without a supportive strategy with given HSV-TK lymphocytes in patients with high-risk acute leukaemia
Funding organisation: Molmed SpA
File: 2009-012973-37
Duration: 2017 - 2019

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Collaboration projects

Principal investigator: Susana Rives Solà (Hospital Sant Joan de Déu), Sergi Querol Giner (BST)
An extended treatment protocol for paediatric/ young adult patients with relapsed/refractory acute lymphoblastic leukaemia to be treated with CTL019
Funding organisation: Novartis Farmacéutica, S.A.
File: 2016-001991-31
Duration: 2017 - 2019

Principal investigator: Ferran Pellisé Urquiza (Hospital Vall d'Hebron), Joaquim Vives Armengol
A combinatorial treatment of neural precursor cells and a new Fasudil nanoconjugate for clinical application in acute spinal cord injury
Funding organisation: TV3 Marathon Foundation
File: 384/C/2017
Duration: 2018 - 2020

Principal investigator: Alena Gros Vidal (Hospital Vall d'Hebron), Sergi Querol Giner (BST)
Cell therapy with TILs for patients with solid tumours: preclinical expansion, validation and sending of IMPD/clinical trial to AEMPS
Funding organisation: BST
File: I.2018.028
Duration: 2018 – 2021

Principal investigator: David Valcárcel Ferreiras (Hospital Vall d'Hebron), Sergi Querol Giner (BST)
A phase III, multicentre, controlled, randomised study to compare the safety and efficacy of haploidentic hematopoietic progenitor transplantation with coadjuvant treatment with ATIR101 versus haploidentic hematopoietic progenitor transplantation with post-transplant cyclophosphamide in patients with a malignant hematologic disease
Funding organisation: Kiadis Pharma
File: 2016-004672-21
Duration: 2018 – 2019

Principal investigator: Susana Rives Solà (Hospital Sant Joan de Déu), Sergi Querol Giner (BST)
A phase I open-label, non-comparative study for evaluating the safety of UCART19 and its ability to induce molecular remission in paediatric patients with recurrent/refractory acute B-cell lymphoblastic leukaemia.
Funding organisation: Servier
File: 2015-004293-15
Duration: 2019

Principal investigator: Cristina Diaz Heredia (Hospital Vall d'Hebron), Sergi Querol Giner (BST)
A phase II, open-label, multicentre, single-arm study for determining the safety and efficacy of tisagenlecleucel in paediatric patients diagnosed with relapsed/refractory mature non-Hodgkin's lymphoma
Funding organisation: Novartis
File: 2017-005019-15
Duration: 2019

Principal investigator: Cristina Diaz Heredia (Hospital Vall d'Hebron), Sergi Querol Giner (BST)
A phase III, registry, multicentre, randomised trial, involving the transplantation of NiCord®, stem cells and progenitors derived from umbilical cord blood expanded ex vivo, versus non-manipulated umbilical cord blood in patients with malignant hematologic neoplasms
Funding organisation: Gamida
File: 2016-000704-28
Duration: 2018 – 2019

Principal investigator: Juan Martin Liberal (ICO Duran i Reynals), Sergi Querol Giner (BST)
A phase II, multicentre trial to evaluate the efficacy and safety of tumour infiltrating T lymphocytes (LN-145) in patients with recurrent, metastatic, or persistent cervical cancer
Funding organisation: Lion Biotechnologies, Inc.
File: 2016-003447-11
Duration: 2019

Principal investigator: Juan Martin Liberal (ICO Duran i Reynals), Sergi Querol Giner (BST)
A phase II, multicentre, 3-cohort trial for evaluating the safety and efficacy of tumour-infiltrating T lymphocytes (LN-144) in patients with metastatic melanoma
Funding organisation: Lion Biotechnologies, Inc.
File: 2017-000760-15
Duration: 2019

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Principal investigator: Juan Martin Liberal (ICO Duran i Reynals), Sergi Querol Giner (BST)
A phase II, multicentre trial with tumour-infiltrating T lymphocytes (LN-144 or LN-145) in patients with solid tumours
Funding organisation: Lion Biotechnologies, Inc.
File: 2018-001608-12
Duration: 2019

Principal investigator: Anna Sureda Balari (ICO Duran i Reynals), Sergi Querol Giner (BST)
Tisagenlecleucel versus standard treatment in adult patients with aggressive relapsed/ refractory non-Hodgkin B-cell lymphoma: phase III, open-label, randomised trial (BELINDA)
Funding organisation: Novartis
File: 2016-002966-29
Duration: 2019

Principal investigator: Josep Tabernero Caturla (VHIO), Sergi Querol Giner (BST)
An open-label phase II trial with the anti-PD-L1 monoclonal antibody Atezolizumab in combination with Bevacizumab in patients with advanced chemotherapy-resistant colorectal cancer and molecular signature similar to microsatellite instability.
File: 2016-002001-19
Funding organisation: European Commission
Duration: 2019

Principal investigator: Enriqueta Felip Font (VHIO), Sergi Querol Giner (BST)
A randomized pilot phase Ib/IIa trial for evaluating the safety and tolerability of NY-ESO-1/LAGE-1a-specific autologous TCRs (GSK3377794) alone or in combination with Pembrolizumab in HLA-A2 + participants with advanced or recurrent NY-ESO-1- or LAGE-1a-Positive lung cancer
File: 2018-003949-42
Funding organisation: GlaxoSmithKline
Duration: 2019

Principal investigator: Enriqueta Felip Font (VHIO), Sergi Querol Giner (BST)
An open-label, multicentre phase I/IIa trial for evaluating the safety and clinical activity of neoantigen-reactive T cells in patients with advanced non-microcytic lung carcinoma
File: 2018-001005-85
Funding organisation: Achilles
Duration: 2019

Principal investigator: Pere Barba Suñol (Hospital Vall d'Hebron), Sergi Querol Giner (BST)
A phase I/II, multicentre, open-label, single-group trial for evaluating the safety and clinical activity of AUTO3, a T-CAR lymphocyte treatment targeted at CD19 and CD22, and a consolidation treatment with an antibody versus PD-1 in patients with relapsed or refractory diffuse large B-cell lymphoma
File: 2016-004682-11
Funding organisation: Autolus
Duration: 2019

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Publications

Alvarez-Palomo B, **Vives J**, **Casaroli-Marano RPP**, **G Gomez SG**, **Rodriguez Gómez L**, Edel MJ, **Querol Giner S**. Adapting Cord Blood Collection and Banking Standard Operating Procedures for HLA-Homozygous Induced Pluripotent Stem Cells Production and Banking for Clinical Application. J CLIN MED 2019 Apr 8;8(4). QUARTILE 1, IF 5.688

Grau-Vorster M, **Rodríguez L**, **Del Mazo-Barbara A, Mirabel C**, **Blanco M**, **Codinach M**, **Gómez SG**, **Querol S**, **García-López J**, **Vives J.** Compliance with Good Manufacturing Practice in the Assessment of Immunomodulation Potential of Clinical Grade Multipotent Mesenchymal Stromal Cells Derived from Wharton's Jelly. CELLS 2019 May 21;8(5). QUARTILE 1, IF 5.656

Rudilla F, Franco-Jarava C, Martínez-Gallo M, Garcia-Prat M, Martín-Nalda A, Rivière J, Aguiló-Cucurull A, **Mongay L**, **Vidal F**, Solanich X, Irastorza I, Santos-Pérez JL, Tercedor Sánchez J, Cuscó I, Serra C, Baz-Redón N, Fernández-Cancio M, Carreras C, Vagace JM, Garcia-Patos V, Pujol-Borrell R, Soler-Palacín P, Colobran R. Expanding the Clinical and Genetic Spectra of Primary Immunodeficiency-Related Disorders With Clinical Exome Sequencing: Expected and Unexpected Findings. FRONT IMMUNOL 2019 Oct 1;10:2325. QUARTILE 2, IF 4.716

Grau-Vorster M, Laitinen A, Nystedt J, **Vives J**. HLA-DR expression in clinical-grade bone marrow-derived multipotent mesenchymal stromal cells: a two-site study. STEM CELL RES THER 2019 Jun 13;10(1):164. QUARTILE 1, IF 4.627

Cabrera-Pérez R, Monguió-Tortajada M, Gámez-Valero A, **Rojas-Márquez R**, Borràs FE, Roura S, **Vives J.** Osteogenic commitment of Wharton's jelly mesenchymal stromal cells: mechanisms and implications for bioprocess development and clinical application. STEM CELL RES THER 2019 Nov 28;10(1):356. QUARTILE 1, IF 4.627

Querol S, **Samarkanova D.** Rapid review: next generation of cord blood banks; transplantation and beyond. TRANSFUSION 2019 Aug 2. QUARTILE 2, IF 3.111

Enrich E, **Campos E**, **Martorell L**, **Herrero MJ**, **Vidal F**, **Querol S**, **Rudilla F.** HLA-A, -B, -C, -DRB1 and -DQB1 allele and haplotype frequencies: An analysis of umbilical cord blood units at the Barcelona Cord Blood Bank. HLA 2019 Jul 29. QUARTILE 2, IF 2.785

Roura S, **Vives J.** Extracellular vesicles: squeezing every drop of regenerative potential of umbilical cord blood. METABOLISM 2019 Jun;95:102-104. QUARTILE 1, IF: 6.513

Grau-Expósito J, Luque-Ballesteros L, Navarro J, Curran A, Burgos J, Ribera E, Torrella A, Planas B, Badía R, Martin-Castillo M, **Fernández-Sojo J**, Genescà M, Falcó V, Buzon MJ. Latency Reversal Agents Affect Differently the Latent Reservoir Present in Distinct CD4+ T Subpopulations. PLOS PATHOG 2019 Aug 19;15(8):e1007991. QUARTILE 1, IF 6.463

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Marín-Sánchez A, Álvarez-Sierra D, González O, Lucas-Martin A, Sellés-Sánchez A, **Rudilla F**, **Enrich E**, Colobran R, Pujol-Borrell R. Regulation of TSHR Expression in the Thyroid and Thymus May Contribute to TSHR Tolerance Failure in Graves' Disease Patients via Two Distinct Mechanisms. FRONT IMMUNOL 2019 Jul 18;10:1695. QUARTILE 2, IF 4.716

Bueno JL, Alegre A, López-Villar O, Querol S, Arroyo JL, Goterris R, Sureda A, García-Gala JM, Amunarriz C, Albo C, Fernandez-Fuertes F, Medina L, Antelo ML, Blanquer M, Vallejo C, Canales M, Vidales-Mancha I, Duarte R. Agreements and uncertainties in autologous haematopoietic stem cell mobilization and collection. A spanish consensus document. BONE MARROW TRANSPLANTAT 2019. Nov 6. doi: 10.1038/s41409-019-0716-9. QUARTILE 1, IF 4.674

Ortí G, García-Cadenas I, López-Corral L, Pérez A, Jimenez MJ, Sánchez-Ortega I, Alonso L, Sisinni L, Fox L, Villacampa G, Badell I, de Heredia CD, Parody R, Ferrà C, Solano C, Caballero D, Martino R, **Querol S**, Valcárcel D. Donor lymphocyte infusions for B-cell malignancies relapse after T-cell replete allogeneic hematopoietic cell transplantation. BONE MARROW TRANSPLANT 2018 Dec 13. QUARTILE 1, IF 4.674

Esquirol A, **Querol S**, Garcia-Cadenas I, Novelli S, Garrido A, Saavedra S, Moreno C, Granell M, Caballero A, Brunet S, Briones J, Martino R, Sierra J. When an HLA identical donor is not available in adults with hematological neoplasms: single-center comparison of single-unit cord blood transplantation and haploidentical-related PBSC transplantation with PTCy using a standardized conditioning platform (thiotepa-busulfan-fludarabine). ANN HEMATOL 2019 Dec 17. QUARTILE 3, IF 2.850

Alonso L, **Rudilla F**, Gimeno R, **Codinach M, Blanco M**, **Querol S**, Diaz de Heredia C. Successful treatment of post-transplant CMV meningoencephalitis with third-party CMV virus-specific T cells: Lessons learned. PEDIATR TRANSPLANT 2019 Sep 26:e13584. QUARTILE 3, IF 1.326

Roura S, **Rudilla F**, Gastelurrutia P, **Enrich E**, Campos E, Lupón J, Santiago-Vacas E, **Querol S**, Bayés-Genís A. Determination of HLA-A, -B, -C, -DRB1 and -DQB1 allele and haplotype frequencies in heart failure patients. ESC HEART FAILURE 2019. Apr;6(2):388-395. QUARTILE i 4, IF 0

2.3. Tissue Bank programme

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

Researchers also have a coordinating role for projects, analysing their viability and, when possible, raising resources for their development through competitive public grants (Spain and the European Community), private entities and foundations and in the business field related to the sector.

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

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

The strategy of our R+D+i programme thus enhances the different lines of research regarded as strategic for the organization, taking into account other aspects, such as the fact that our first priority is the patient. And as fundamental pillars of all this, we have the ethical and regulatory framework, the quality and excellence, as well as the commitment to sustainability.

Director
Ricardo P Casaroli Marano

Researchers
Elba Agustí Robira
Caterina Aloy Reverte
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Marisa Pérez Rodriguez
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José Ignacio Rodríguez Martínez
Andres Savio Lopez
Jaime Tabera Fernandez
Anna Vilarrodona Serrat

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Research projects

Projects with PI or CO-PI from the BST

Principal investigator: Anna Vilarrodona Serrat
Euro-GTP-II: Good practices for demonstrating safety and quality through receiver follow-up
Funding organisation: European Commission
File: 709567
Duration: 2016 – 2019

Principal investigator: Ricardo Casaroli Marano
Induced pluripotent cells and cell reprogramming in cell-based approaches for corneal regeneration
Funding organisation: Carlos III Institute of Health
File: PI18/00355
Duration: 2019 -2021

Principal investigator: Ricardo Casaroli Marano
Ex vivo culture and expansion of human corneal endothelial cells in biomimetic biocompatible substrates: Functional characterisation and clinical applicability
Funding organisation: Institute of Ocular Microsurgery
File: I.2017.013
Duration: 2016 – 2019

Principal investigator: Pablo Gelber (Hospital de Sant Pau) i Oscar Fariñas Barberà
Fresh preservation of osteochondral allografts at 37°C
Funding organisation: Carlos III Institute of Health
File: PI18/01771
Duration: 2019 -2021

Principal investigator: Patricia Lopez Chicon
Optimisation of the conditions of products intended for tissue transplantation
Funding organisation: BST
File: I.2017.038
Duration: 2017 - 2020

Principal investigator: Marisa Perez Rodriguez
A study of the biological properties of a dermal matrix of human origin for its application in pelvic organ prolapse correction surgeries
Funding organisation: BST
File: I.2017.039
Duration: 2017 - 2020

Principal investigator: Oscar Fariñas Barbera
DBM Development of demineralized bone matrix with human collagen
Funding organisation: BST
File: I.2015.023
Duration: 2016 - 2019

Principal investigator: Núria Nieto Nicolau
Obtaining decellularised nerve matrix for the regeneration of peripheral nerves
Funding organisation: BST
File: I.2017.055
Duration: 2017 - 2020

Principal investigator: Caterina Aloy
Isolation and expansion of keratinocytes from the epidermis
Funding organisation: BST
File: I.2017.057
Duration: 2018 - 2019

Principal investigator: Cristina Castells Sala
Development of a heart valve decellularisation method to be used in valve replacement surgeries
Funding organisation: BST
File: I.2018.027
Duration: 2018 - 2021

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Collaboration projects

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

Publications

Nieto-Nicolau N, **Martínez-Conesa EM**, Velasco-García AM, **Aloy-Reverté C**, V**ilarrodona A**, **Casaroli-Marano RP.** Xenofree generation of limbal stem cells for ocular surface advanced cell therapy. STEM CELL RES THER 2019 Dec 4;10(1):374. QUARTILE 1, IF 4.627

Trias E, Lomas R, **Tabera J**, **Piteira AR**, Tilleman K, **Casaroli-Marano RP**, Chandrasekar A; EuroGTP II Study Group. EuroGTP II: a tool to assess risk, safety and efficacy of substances of human origin. INT J QUAL HEALTH CARE 2019 May 14. QUARTILE 3, IF 1.829

Zubizarreta I, Flórez-Grau G, Vila G, Cabezón R, España C, Andorra M, Saiz A, Llufriu S, Sepulveda M, Sola-Valls N, Martinez-Lapiscina EH, Pulido-Valdeolivas I, Casanova B, Martinez Gines M, Tellez N, Oreja-Guevara C, Español M, **Trias E**, Cid J, Juan M, Lozano M, Blanco Y, Steinman L, Benitez-Ribas D, Villoslada P. Immune tolerance in multiple sclerosis and neuromyelitis optica with peptide-loaded tolerogenic dendritic cells in a phase 1b trial. PROC NATL ACAD SCI USA 2019 Apr 23;116(17):8463-8470. QUARTILE 1, IF 9.580

Vilaplana F, Nadal J, Temprano J, Julio G, Olivera M, **Casaroli-Marano RP**, Barraquer RI. Vitrectomy for endophthalmitis in eyes with osteokeratoprosthesis. RETINA 2019 Mar 5. QUARTILE 1, IF 3.815

Pereira BS, van Dijk CN, Andrade R, **Casaroli-Marano RP**, Espregueira-Mendes J, Oliva XM. The calcaneofibular ligament has distinct anatomic morphological variants: an anatomical cadaveric study. KNEE SURG SPORTS TRAUMATOL ARTHROSC 2019 Nov 27. QUARTILE 1, IF 3.149

Canamary AM Jr, Monteiro IR, Machado Silva MKM, Regatieri CVS, Silva LMP, **Casaroli-Marano RP**, Muccioli C. Quality-of-Life and Psychosocial Aspects in Patients with Ocular Toxoplasmosis: A Clinical Study in a Tertiary Care Hospital in Brazil. OCUL IMMUNOL INFLAMM 2019 Oct 7:1-9. QUARTILE 2, IF 2.231

Fernández Zamora Y, Finamor LP, Silva LMP, Rodrigues DS, **Casaroli-Marano RP**, Muccioli C. Current Practices in Ocular Tuberculosis: A Survey of Brazilian Specialists. OCUL IMMUNOL INFLAMM 2019 Feb 26:1-6. QUARTILE 2 IF 2.231

2.4. Biological safety programme

The Transfusion Safety Laboratory (LST from its Spanish initials) aims to improve the pathophysiological, epidemiological and detection knowledge of infectious agents relevant to the safety of blood, cells, tissues and breast milk.

In this respect, one must highlight the activity developed to improve knowledge of the presence of pathogens from other countries among the reference Catalan population of the BST.

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 application 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 Transfusion Safety Laboratory (LST) is made up of the Care Unit and the R&D Unit in 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
Maria Costafreda Salvany
Meritxell Llorens Revull
Maria Piron

Support staff
Cristina Garcia Garcia
Angeles Rico Blázquez

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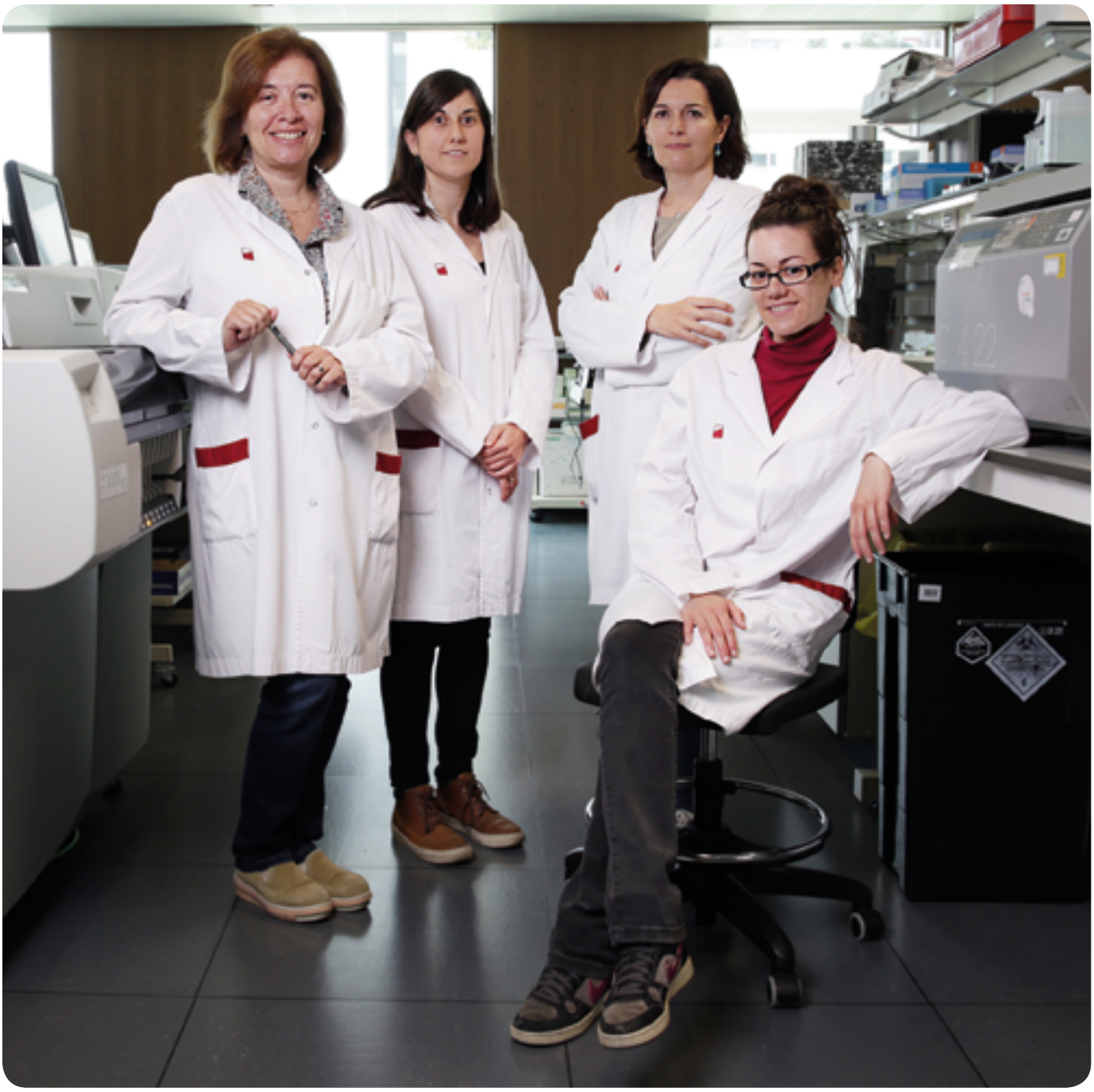
Research projects

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 - 2019

Principal investigator: Maria Piron
Platform for the epidemiological surveillance of arbovirus among blood donors in Catalonia
Funding organisation: BST
File: I.2017.040
Duration: 2017 - 2019

Principal investigator: Marta Bes Maijó
Epidemiological and pathophysiological evaluation of hepatitis E virus infection among blood donors
Funding organisation: BST
File: I.2017.051
Duration: 2017 - 2020



Collaboration projects

Principal investigator: Josep Quer Sivila (Hospital Vall d'Hebron), Sílvia Sauleda Oliveras (BST)
Development of diagnostic applications in HCV infection based on real-time single molecule sequencing (SMRT-NNGS)
Funding organisation: Carlos III Institute of Health
File: PI16/00337
Duration: 2017 - 2019

Principal investigator: Celia Perales Viejo (Hospital Vall d'Hebron), Sílvia Sauleda Oliveras (BST)
Exosomes as biomarkers of liver disease progression after hepatitis C virus cure
Funding organisation: Carlos III Institute of Health
File: PI18/00210
Duration: 2019 - 2021

Publications

Costafreda MI, Kaplan G. Reply to Das et al., "TIM1 (HAVCR1): an Essential 'Receptor' or an 'Accessory Attachment Factor' for Hepatitis A Virus?" J VIROL 2019 May 15;93(11). QUARTILE 1, IF 4.324

De Mendoza C, Pirón M, Gonzalez R, Jiménez A, Caballero E, Roc L, Benito R, Ramos JM, Soriano V; HTLV Spanish Study Group. Clinical Presentation of Individuals With Human T-Cell Leukemia Virus Type-1 Infection in Spain. OPEN FORUM INFECT DIS 2019 Jan 16;6(2):ofz036. QUARTILE 2, IF 3.371

Mühlbacher A, Sauleda S, **Piron M**, Rietz R, Permpikul P, Klinkicht M, Gloeck M, Imdahl R. A multicentre evaluation of the Elecsys® HIV Duo assay. J CLIN VIROL 2019 Mar;112:45-50. QUARTILE 2, IF 3.020

de Mendoza C, Roc L, Benito R, Reina G, Ramos JM, Gómez C, Aguilera A, Rodríguez-Iglesias M, García-Costa J, Fernández-Alonso M, Soriano V; Spanish HTLV Network. HTLV-1 infection in solid organ transplant donors and recipients in Spain. BMC INFECT DIS 2019 Aug 9;19(1):706. QUARTILE 3, IF 2.565

Seed CR, Allain JP, Lozano M, Laperche S, Gallian P, Gross S, Kwon SY, Oh EY, Kim JN, Chua SS, Lam S, Ang AL, Tsoi WC, Hewitt PE, Davison KL, Tettmar K, O'Flaherty N, Boland F, Williams P, Pomeroy L, Wendel S, Fachini R, Scuracchio P, Carminato P, Fearon M, O'Brien SF, Delage G, Kiely P, Hoad V, Matsubayashi K, Satake M, Taira R, Stramer SL, **Sauleda S**, **Bes M**, **Piron M**, El Ekiaby M, Vermeulen M, Levičnik Stezinar S, Nograšek P, Jarvis LM, Petrik J, Charlewood R, Flanagan P, Grabarczyk P, Kopacz A, Łętowska M, Seifried E, Schmidt M. International Forum on Occult hepatitis B infection and transfusion safety. VOX SANG 2019 May;114(4):e1-e35. QUARTILE 3, IF 2.364

Sánchez Ibáñez J, Vilarrodona Serrat A, Seoane Pillado T, Rodriguez Aierbe C, Villalba Montoro R, Calvo Benito J, Pevida Lopez M, Fernández Paneque S, Vuelta Lopez E, Martínez Lorenzo MJ, González Romero M, Cañizares Castellanos A, **Sauleda Oliveras S.** Evaluation of occult hepatitis B infection in tissue donors: a multicenter analysis in Spain. CELL TISSUE BANK 2019 Aug 26. QUARTILE 3, IF 1.939

de Mendoza C, Roc L, Fernández-Alonso M, Soriano V; Spanish HTLV Network. HTLV testing of solid organ transplant donors. CLIN TRANSPLANT 2019 Jul 18:e13670. QUARTILE 3, IF 1.667

Roc L, de Mendoza C, Fernández-Alonso M, Reina G, Soriano V; Spanish HTLV Network. Rapid subacute myelopathy following kidney transplantation from HTLV-1 donors: role of immunosuppresors and failure of antiretrovirals. THER ADV INFECT DIS 2019 Aug 21;6:2049936119868028. QUARTILE 4, IF 0

2.5. Blood, cell and tissue donation programme

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

Directed by Aurora Masip Treig, it aims to develop projects for the improvement of, among other things, our knowledge of donor 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.

Research will focus on, among other priorities, the study of ethical principles, promotion, donation behaviours and, above all, the protection, well-being and comfort of the donor.

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3. The core platforms

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

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

3.1. Genome platform

The Banc de Sang i Teixits Genome Platform arose from the growing need to adapt molecular diagnostic protocols to new massive sequencing platforms (NGS) and from the interest in applying this technology to different research and innovation projects. Extensive experience in NGS application development is complemented by a strong support structure in equipment. The platform currently has two next-generation Illumina sequencers, MiSeq and NextSeq 500, which allow great scalability for addressing protocols ranging from the identification of point variants in one or a few genes to the sequencing of complete exomes. The platform's functions include the management and optimisation of the use of NGS technology, and the offering of technical support to researchers who want to apply high-performance genomic analysis techniques to their work in project design and development and in data execution and analysis. In this sense, it is essential to support projects from the outset in order to determine the most appropriate strategy to achieve the objectives.

Director
Irene Corrales Insa

Researchers
Nina Borras Agustí
Natàlia Comes Fernandez
Carlos Hobeich Naya
Francisco Vidal Perez

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3.2. Cell platform

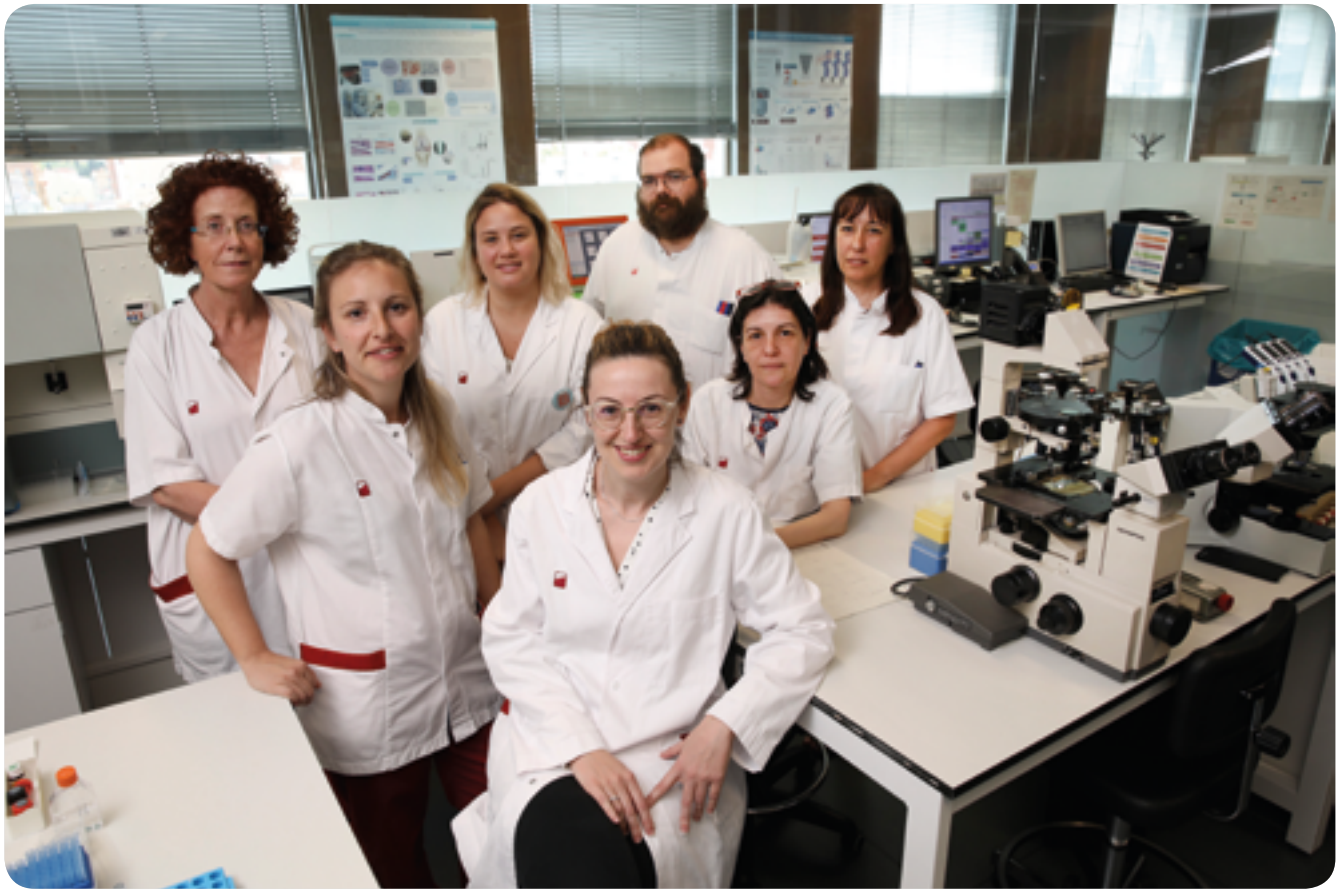
Its functions include the maintenance and provision of the necessary equipment to researchers working in cell culture and characterization (mainly by cytometry, microscopy and metabolism analysis), as well as the basic training needed to make a correct use of it.

Moreover, the experience of the platform's professionals will be 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 and in data management and analysis.

In summary, the functions of the platform will include: user training, organisation of the uses of the devices and management of incidents, supervision, maintenance and calibration/verification of the devices, the development and updating of Standard Working Procedures, support for users in the design and execution of tests with cells and technological surveillance, among other things.

Director
Maria Gloria Soria Guerrero

Researchers
Francisco Javier Algar Gutierrez
Begoña Amill Camps
Margarita Blanco Garcia
Margarita Codinach Creus
Ruth Forner Gómez
Mireia Lloret Sanchez
Isabel Tarragó Canela
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 products generated by their research and those promoted by their public and private collaborators. It is, besides, the channel of communication with regulatory agencies.

Its head is
Dra. Ruth Coll Bonet

3.4. The Biobank

The Banc de Sang i Teixits (BST) Biobank provides the scientific community with the necessary biological material, and in optimal conditions, contributes to its research excellence while guaranteeing the rights of donors.

It began to function on 17 September 2010, with provisional authorisation, and obtained final administrative authorisation on 12 April 2013.

It currently has a transversal structure that manages the transfer of biological samples (blood components, plasma, serum, progenitors, tissues, etc.) between the different departments of the BST and the researchers who request them.

The scientific committee of the Biobank:

Dra. Aurora Navarro
Coordinator of the Notify project

Dr. Francisco Vidal
Head of the Laboratory of Congenital Coagulopathies

Dra. Silvia Sauleda
Head of the Transfusion Safety Laboratory (LST)

Dr. Eduard Muñiz
Head of the Immunohematology Division

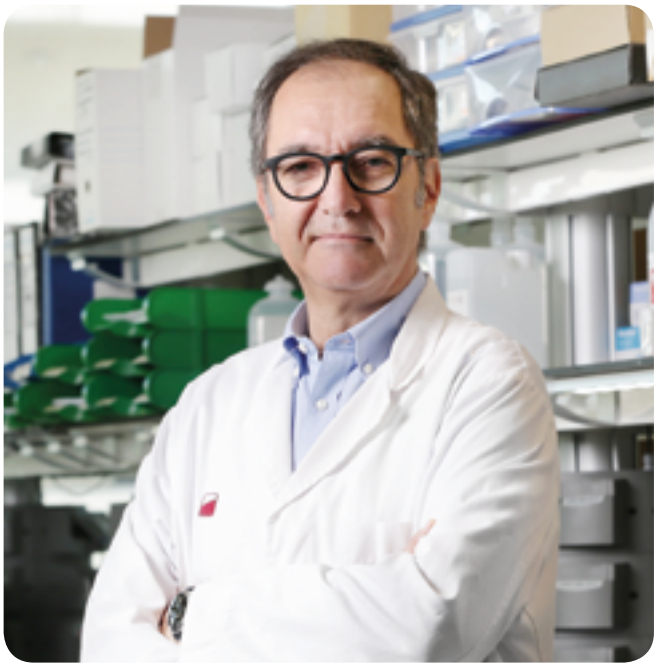
Dr. Sergi Querol
Head of the Cell Therapy Service

The scientific direction of the Biobank:

Dr. Joan Garcia López,
Director de Recerca i Educació del BST

Sra. Pilar Monleón
Coordinadora i gestió de la cessió de les mostres

Joan Garcia



Pilar Monleon

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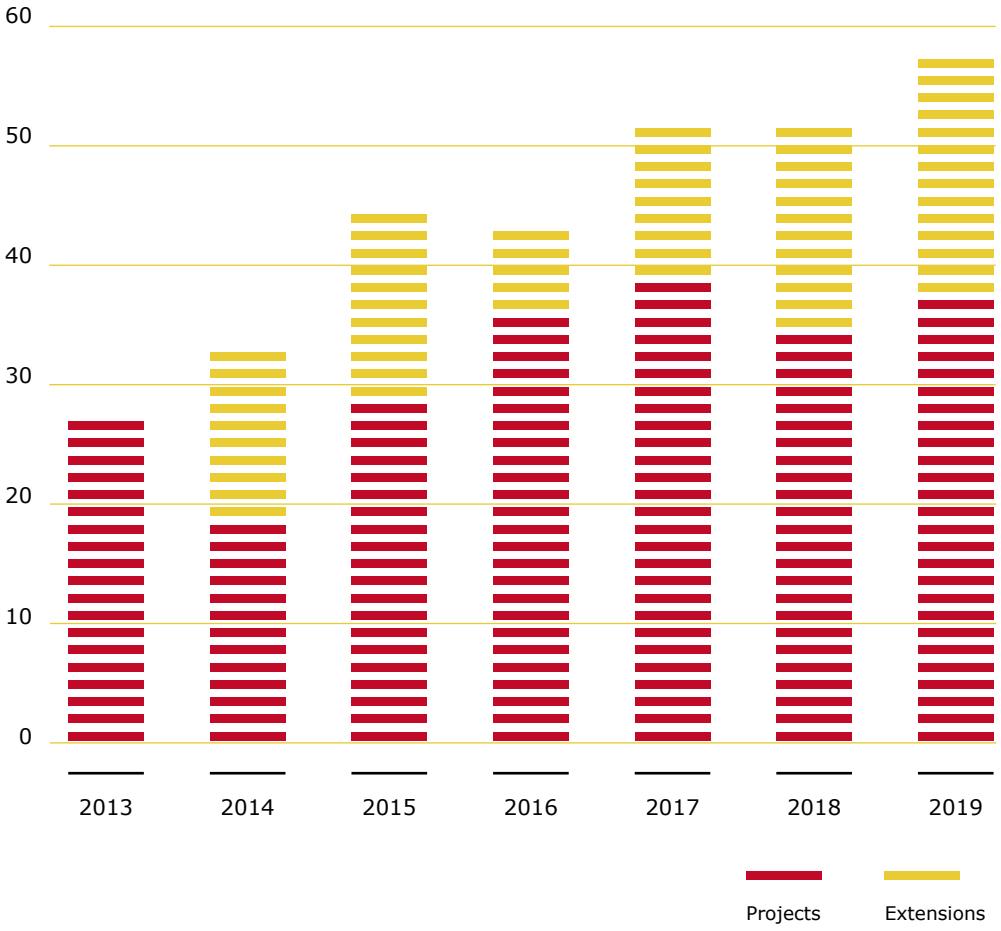
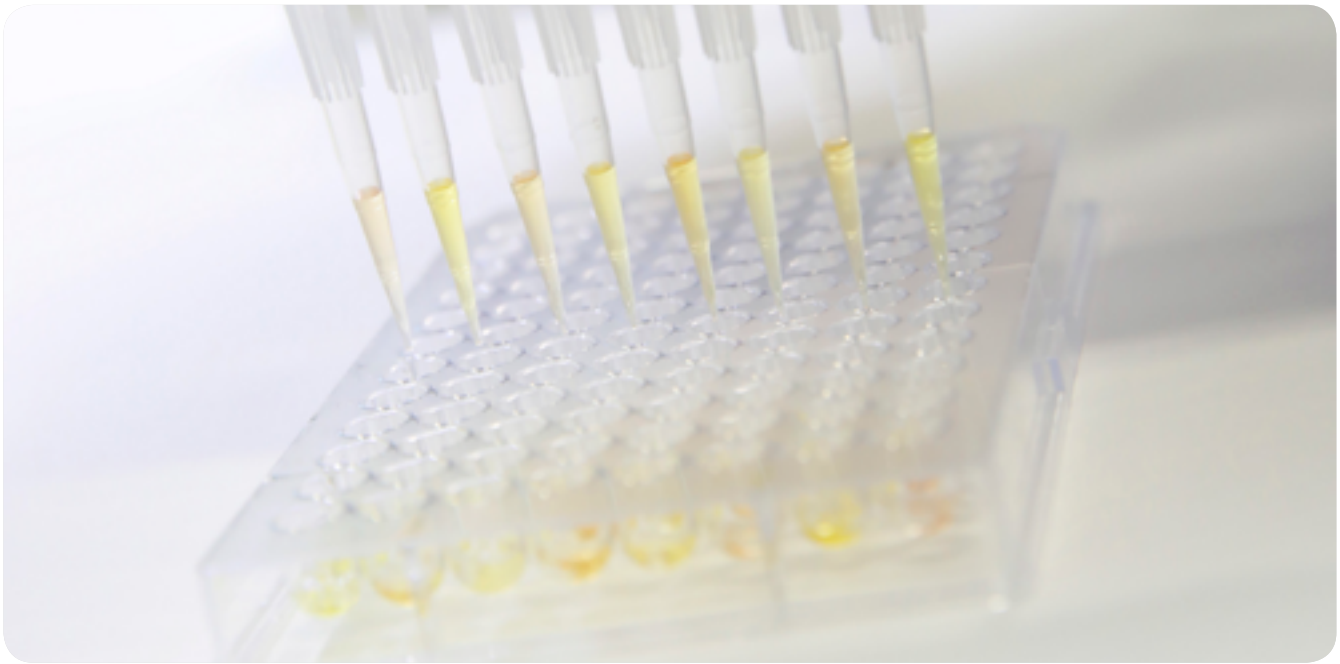
Evolution of the number of projects and extensions since 2013

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

In 2019, the transfer of samples to 37 research projects and 20 extensions of previously approved projects was approved. The full description of all the activity can be found in the report on the 2019 BST Biobank.





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85,066 samples for research projects

2,565 internal BST projects

There has been constant growth in activity since the BST biobank was created.

Agreements for the transfer of biological samples are regulated by agreements with research institutions, universities or companies of the healthcare sector. To date, 124 collaboration agreements have been signed.

In 2019, collaboration agreements were signed with the *Vall d'Hebron Institute of Oncology Research (VHIO), CEEISCAT, the IMIM Foundation, the Parc Tauli Foundation, the University of Barcelona, and the companies Medcom Advance, S.A., Peptomyc, S.L., Kymos, Diasorin and Euvitro-Eugin.*

In 2019, a total of 85,066 samples were provided for research projects (2,565 correspond to internal BST projects).

These come from the different BST services shown in the table below, which also gives the number of units delivered.

BLOOD COMPONENTS DEVELOPMENT LAB	TRANSFUSION SAFETY LAB	CELL THERAPY SERVICE	TISSUE BANK	MILK BANK	DONATIONS FROM HOSPITAL CENTRES
3.630	80.196	355	50	54	781

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18,065 mostres per la realització de pràctiques d'estudiants

To these one must add 18,065 samples delivered for internships by students from Schools and Universities such as the *Faculties of Biology and Pharmacy of the University of Barcelona, the Faculty of Biosciences of the Autonomous University of Barcelona and various institutes throughout Catalonia.*

In 2019, 11 new products from the Milk Bank (2), the Cell Therapy Service (7) and the Tissue Bank (2) were made available to researchers.

Finally, the economic activity of the Biobank in 2019, with a turnover of €255,458, represents a growth of 14% compared to the previous year.

11 new products

2 Milk Bank

2 Tissue Bank

7 Cell Therapy Service

255,458€ a growth of 14% compared to the previous year

4. Education at the BST

The mission of the BST educational area is to promote and collaborate in the training of students and professionals in the field of Transfusion Medicine and Cell and Tissue Therapy and other Health and Life Sciences.

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

Moreover, it manages collaboration agreements, coordinates and plans the training of residents, the training stays of external and internal professionals as well as those of interns in the different departments of the BST.

The activity of the educational area, which can be seen in detail in the 2019 report, is aimed at different groups:

4.1. Students from other institutions

4.1.1. Schools and institutes

Intermediate and advanced degree students in vocational training from the following schools and institutes have done internships:

- The Pedraforca Institute
- The Granollers Municipal Work School Institute
- The Work School of Barcelona
- The La Guineueta Institute
- The Jesuits of Clot School
- The Santa Maria dels Apòstols School
- The Ramon y Cajal School
- The Dolmen Study Centre
- The Joviat School in Manresa

9 students (2018-2019) have completed their internship in the higher degree training cycle and 14 new ones have started in the specialties of clinical and biomedical laboratory (10) and pathological anatomy and cytodiagnosis (4). All of them have rotated through the different services of the BST.

13 high-school students (8 at the BST headquarters, 3 at the BST-Sant Joan de Reus and 2 at the BST-Girona) from the following schools/institutes have also done internships:

- The Garbí Pere Vergés School
- the Salvador Vilaseca Institute
- La Salle Bonanova
- Tarragona i Congrés
- The La Bisbal Institute
- The Sagrada Família School

4.1.2. Universities

The tutoring of 11 undergraduate students from the following universities was carried out at the BST's headquarters: *the Autonomous University of Barcelona, Pompeu Fabra University, the Polytechnic University of Catalonia, the University of Barcelona and Rovira i Virgili University.*

39 nursing students from the *Gimbernat, Sant Pau, Terrassa, University of Lleida, Manresa and Pompeu Fabra* University Schools have also done their internships in the territorial centres of the BST.

Finally, 9 master's degree students from the *Autonomous University of Barcelona, University of Barcelona, University of Lleida, Sarrià Chemical Institute and Sant Joan de Déu Hospital* have rotated through the different departments of the BST.

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4.2. Resident doctors

The BST is accredited by the Ministry of Health and Social Policy as a reference teaching unit for the training in Haemotherapy of resident doctors (RMIs).

In 2019, 15 RMIs from practically all hospitals in Catalonia were trained at the BST-Central.

This rotation lasts between 1.5 and 3 months and includes the different laboratories and areas of the BST:

- Immunohematology Laboratory
- HLA Laboratory (except for RMIs from Sant Pau Hospital)
- Laboratory of Congenital Coagulopathies (CC)
- Cell Therapy Laboratory (LTC, from its Catalan initials).
- Cell Laboratory (LC)
- Blood Components Development Laboratory (LECS)
- Transfusion Safety Laboratory (LST)
- Department of Quality and Communication (Q/C)

Other specialties and RMIs from other autonomous communities have also rotated:

- A resident of the Immunology specialty from Germans Trias i Pujol University Hospital (HLA laboratory)
- Seven residents of the internal medicine, clinical analysis and family specialties (at the BST of the Hospitals of Reus, Terrassa and Tarragona).
- Three residents from other communities (Central Hospital of Asturias, Negrín Hospital of Gran Canaria and A Coruña Hospital)

4.3. 3. Postgraduate studies: the Chair of Transfusion Medicine and Cell and Tissue Therapy (CMT3)

The CMT3 was created in 2008 by means of a collaboration between the BST, the UAB and the Dr. Robert Foundation (currently replaced by the Health and Aging Foundation).

The mission of the Chair is to promote, contribute and consolidate training, research and consulting in the area of Transfusion Medicine and Cell and Tissue Therapy.

Acting as an international benchmark in the training offer in Transfusion Medicine and Cell and Tissue Therapy (MT3)

Currently led by 5 associate professors: Joan Garcia Lopez (Director), Eduard Muñiz Diaz (Deputy Director), Enric Contreras Barbeta, Núria Nogués Gálvez and Joaquim Vives Armengol.

The CMT3 has opted for fully online training. In 2019, the same line of teaching activity has continued with different academic and professional training programmes.

4.3.1. Master's Degree in Transfusion Medicine and Advanced Cell Therapies (MUMTTCA) from its Catalan initials

The second year of the third edition of the Master's Degree in Transfusion Medicine and Advanced Cell Therapies (MUMTTCA, from its Catalan initials) is under way with 33 students from very different backgrounds, as shown in the following graph.

It should be noted that more than 30 BST professionals participate in this programme and that more than 40% of the authors of the materials are international.

Although consolidated, and seeking excellence, work is being done to make it an interuniversity and international master's degree, an agreement having already been signed with Leiden University to accredit it in both countries. All administrative processes are expected to have been completed in 2020.

2018-2020 33 students

Switzerland 1	Canada 1	Grenada 1	USA 1
United Arab Emirates 1	Argentina 1	Costa Rica 1	Belgium 1
Russia 1	Andorra 1	Egypt 1	Portugal 1
Uruguay 2	Peru 2	Mexico 3	Colombia 4
			Spain 10

4.3.2. European School of Transfusion Medicine (ESTM)

Since 2014, the BST has had a collaboration agreement with the European School of Transfusion Medicine (ESTM) in order to promote training and education in its field of action.

A new course has been held in 2019, in collaboration with the ESTM.

This new and successful edition, aimed at quality risk control in blood transfusions, was attended by leading professionals from Portugal, the Basque Country and the BST itself.

4.3.3. The first specialized Postgraduate Course in counselling nursing mothers

In 2019, a new educational activity has been planned and accredited via the collaboration between the Autonomous University of Barcelona, the University of Manresa, the Pro-Breastfeeding Association and the BST Breast Milk Bank.

This is the first specialized Postgraduate Course with accreditation in Spain that is aimed at training health professionals that are highly specialised in counselling nursing mothers.

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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.

4.4. Continuing education

Within the continuing education programme, we have received 16 professionals (doctors, bacteriologists, bio-technologists, immunologists) of different origins: Catalonia, Madrid, United Kingdom, Argentina, Chile and Colombia.

4.5. Training visits

We have received up to 48 training visits from 33 different groups - intermediate and higher education, high school and university students and professionals -, with a total of more than 1,000 attendees.

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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 their research and education work. It is only fair that their contribution be acknowledged.

Specific mention should be made of the people in the Research and Education team:

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BST Project Manager
Elisabet Tahull

Head of Clinical Development
Ruth Coll

BST administrative assistant
Míriam Requena

Educational programme technician at the Health and Ageing Foundation
Marina Vilarmau

Coordinator of UAB educational projects
Remei Camps

Director of the Health and Ageing Foundation
Antoni Salvà

Administrative assistant at the Health and Ageing Foundation
Helena Garrigos

Helena Garrigos

Antoni Salvà

Some of the projects carried out at the BST during 2019 were funded by the Ministry of Science, Innovation and Universities and co-financed by the European Regional Development Fund (ERDF).

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