



Research evaluation

FINAL RESUME ON THE RESEARCH UNIT
BIOTIS - Laboratoire de Bioingénierie Tissulaire

UNDER THE SUPERVISION OF THE
FOLLOWING INSTITUTIONS AND RESEARCH
BODIES:

Université de Bordeaux

Institut national de la santé et de la recherche
médicale – INSERM

EVALUATION CAMPAIGN 2020-2021
GROUP B

Report published on June, 29 2021

High Council for evaluation of research and higher education



In the name of Hcéres¹:

Mr Thierry Coulhon, President

In the name of the experts committee²:

Mr Jérôme Chevalier, Chairman of the
committee

Under the decree No.2014-1365 dated 14 November 2014,

¹ The president of Hcéres "countersigns the evaluation reports set up by the experts committees and signed by their chairman." (Article 8, paragraph 5);

² The evaluation reports "are signed by the chairman of the experts committee". (Article 11, paragraph 2).

Tables in this document were filled with certified data submitted by the supervising body on behalf of the unit.

UNIT PRESENTATION

Unit name:

Laboratoire de Bioingénierie Tissulaire

Unit acronym:

BIOTIS

Current label and N°:

1026

ID RNSR:

201119376T

Application type:

Renewal

Head of the unit (2020-2021):

Mr. Jean-François Fricain

Project leader (2021-2025):

Mr. Nicolas L'heureux

Number of teams:

2

EXPERTS COMMITTEE MEMBERS

Chair:

Mr Jérôme Chevalier, INSA Lyon

Experts:

Mr Frédéric Cuisinier, Université de Montpellier (representative of CNU)

Mr Franck Lavenne, Inserm (supporting personnel)

Mr Alini Mauro, AO Research Institute

Mr André Pelegrin, Inserm (representative of CSS Inserm)

HCÉRES REPRESENTATIVE

Mr Yacine Graba

REPRESENTATIVES OF SUPERVISING INSTITUTIONS AND BODIES

Mr Gilles Guichard, Université de Bordeaux

Ms Marie-Joseph Leroyzamia, INSERM

Mr Philippe Moretto, Université de Bordeaux

Mr Richard Salives, INSERM

INTRODUCTION

HISTORY AND GEOGRAPHICAL LOCATION OF THE UNIT

BioTis (U1026) was officially created in 2011, as a follow-up of different labels (INSERM U306, U403 and U507). The origin lies in the objective of Mr Charles Baquey in 1987 to create one of the first research units in the field of biomaterials, which then evolved towards bone and vascular tissue engineering approaches (which explains the current acronym BioTis). It is located in the Campus de Carreire, 146 rue Léo Saignat, Bordeaux, nearby the University Hospital Center. A future relocation is forecast at a walking distance from the current location, thus with the same positive environment. BioTis is currently organized as a single team, with two complementary research programs on bone and vascular tissue regeneration and a special emphasize on bio-printing. For the next contract, the unit plans to integrate an EFS (*Etablissement Français du Sang*) group and to organize its activity in two teams, namely 'Cell Engineering' and 'Tissue Engineering'.

RESEARCH ECOSYSTEM

BioTis is a research unit supervised by the University of Bordeaux and INSERM. It has strong functional partnerships with the Bordeaux University Hospital through its numerous clinicians, especially in the dental school. The research unit is involved and plays a pivotal role in the department of Science and Technology for Health of the University of Bordeaux, which obtained the IdEx label in 2011, renewed in 2020. The department brings together cutting-edge expertise's in the fields of biophysics, structural characterization of biological systems, chemistry for living organisms, cell and tissue bioengineering, biomedical imaging and pathophysiology. BioTis was highly involved in the creation of the Bordeaux Consortium for Regenerative Medicine. It is today one leading partner of the 'Frontiers of Life' program submitted to IdEx. Biotis is strongly involved in translational and clinical research, via the CIC-IT, which is led by one of the unit staff and gives strong opportunities for preclinical transfers (from research towards bedside). On a national level, BioTis holds a strong position at INSERM in the field of technology for health and hosts the national bio-printing platform Accelerator of Research in Technology (ART).

HCÉRES NOMENCLATURE AND THEMATICS OF THE UNIT

SVE5_3 (Technology for Health)

MANAGEMENT TEAM

Mr Jean Christophe Fricain is currently Director of BioTis, until 31/12/2021. Mr Nicolas L'Heureux (currently Deputy Director) is proposed as future Director, starting in January 2022, with Mr Sylvain Catros as Deputy Director.

The unit is today composed of one single team. The project proposes a structure with two teams (Tissue Engineering and Cell Engineering), which are to be led by Mr Sylvain Catros and Mr Zoran Ivanovic, respectively.

UNIT WORKFORCE

BIOTIS - Laboratoire de Bioingénierie Tissulaire

Active staff	Number 06/01/2020	Number 01/01/2022
Full professors and similar positions	9	10
Assistant professors and similar positions	6	11
Full time research directors (Directeurs de recherche) and similar positions	3	6
Full time research associates (Chargés de recherche) and similar positions	2	3
Other scientists ("Conservateurs, cadres scientifiques des EPIC, fondations, industries, etc.")	0	1
High school teachers	0	0
Supporting personnel (ITAs, BIATSSs and others, notably of EPICs)	14	17

Permanent staff	34	48
Non-permanent professors and associate professors, including emeritus	3	
Non-permanent full time scientists, including emeritus, post-docs (except PhD students)	4	
PhD Students	13	
Non-permanent supporting personnel	9	
Non-permanent staff	29	
Total	63	48

GLOBAL ASSESSMENT OF THE UNIT

BioTis, organized as a single team during the last contract, has worked on bone, vessels and their interactions, in order to develop innovative tissue engineering approaches and is considered as a major player in the fields of bone and vessels tissue-engineering and of bio-printing.

The scientific production of the unit is excellent, the most visible achievements being on cells-cells and cells-matrix interactions, bio-fabrication and 3D bio-printing, preclinical models and clinical studies (*Angewandte Chemie* in 2015 *Biomaterials* in 2017 and 2018, *Advanced Materials* in 2017). The number of papers published is remarkable, both on the research achievements (130 papers in the evaluation period, 65 % as leader) and clinical research (290 publications) sides. The unit has an outstanding reputation and a very strong position both nationally and internationally (including participations to three European projects (including one advanced ERC) and nine national grants, of which Biotis is coordinator for three). The members of BioTis regularly publish review articles (26) and received scientific prizes (e.g., Paul Calas research prize, EAMBES fellow, etc.). In contrast with this very high quality of research, the committee noticed however that BioTis did not obtain very prestigious recognitions and published few papers in high Impact journals (four papers in high ranked journals during the period).

BioTis interactions with the non-academic world are outstanding because of a remarkable activity towards patenting (nine in the period), translational research and clinical trials and finally the creation of spin-offs (e.g., SilTiss and Poietis). The creation of knowledge and new clinical strategies are widely communicated to the public, nationally and internationally. BioTis therefore presents a very strong reputation beyond its academic field of research. The novel national platform "ART" created in 2016, strengthens the leading position of BioTis in the implementation of bioprinting to the clinic and places the unit at the forefront of the bioprinting technology, with a unique position at the European level. At the medical level, the position of BioTis is outstanding, with five researchers and nineteen associate/research professors with activities in relation to clinical studies and a leading position in the center of clinical investigations CIC-IT.

The unit's involvement in research training is excellent, with the supervision of 27 PhD students (fourteen in progress) and hosting of 87 undergraduates and a strong involvement in teaching at the University of Bordeaux, in particular in the Master "Ingénierie de la santé" and at the UFR "sciences odontologiques". The quality of thesis monitoring is impressive, with a mean duration of 37 months and an average of two first author papers per student. In addition, BioTis is able to organize national and international summer schools and innovative workshops (e.g., first International Summer School on Biomaterials), which confirms its position as a European leader in its field of expertise. The number of postdoctoral fellows (4) constitutes the only significant weakness in BioTis training activity.

The organization of the laboratory is excellent. The life of the unit is dynamic and rich and promotes interactions between all staff members, who share the directions taken by the management team. The equipment and funding ensure very high-quality research, with a strong increase of financial resources during the period (from 435 K€ in 2016 to 1.2 M€ in 2020).

The unit presents an excellent project, especially in terms of scientific objectives and potential innovation, with a general widening towards an organ-agnostic approach and with a continuum from cells in their environment towards tissue engineering and clinical applications. In this framework, BioTis will benefit from the integration of a group from EFS and some other researchers to broaden its scope and to tackle regenerative medicine as a whole. The structure proposed to promote real integration of EFS into the unit still remains to be specified and refined.

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2 rue Albert Einstein
75013 Paris, France
T. 33 (0)1 55 55 60 10

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