Research evaluation

EVALUATION REPORT OF THE UNIT

Prism - Laboratoire de Protéomique, réponse inflammatoire, Spectrométrie de Masse

UNDER THE SUPERVISION OF THE FOLLOWING ESTABLISHMENTS AND ORGANISMS:

Université de Lille – U Lille
Centre hospitalier régional et universitaire de Lille - CHRU Lille
Institut national de la santé et de la recherche médicale - Inserm
Centre Oscar Lambret - Centre régionale de lutte contre le cancer - CLCC Lille

EVALUATION CAMPAIGN 2024-2025
GROUP E

Rapport publié le 03/01/2025

In the name of the expert committee :

Jean Armangaud, chairman of the committee

For the Hcéres :

Stéphane Le Bouler, acting president

In accordance with articles R. 114-15 and R. 114-10 of the Research Code, the evaluation reports drawn up by the expert committees are signed by the chairmen of these committees and countersigned by the president of Hcéres.

To make the document easier to read, the names used in this report to designate functions, professions or responsibilities (expert, researcher, teacher-researcher, professor, lecturer, engineer, technician, director, doctoral student, etc.) are used in a generic sense and have a neutral value.

This report is the result of the unit's evaluation by the expert committee, the composition of which is specified below. The appreciations it contains are the expression of the independent and collegial deliberation of this committee. The numbers in this report are the certified exact data extracted from the deposited files by the supervising body on behalf of the unit.

MEMBERS OF THE EXPERT COMMITTEE

Chairperson:	Mr Jean Armengaud, Commissariat à l'énergie atomique et aux énergies alternatives - CEA, Bagnols-sur-Cèze
Experts:	Ms Christine Braquart Varnier, université de Poitiers (representative of CNU)
	Ms Ida Guerrera, Institut national de la santé et de la recherche médicale, Inserm, Paris (representative of supporting personnel)
	Mr Dimitrios Visvikis, Inserm, Brest (representative of CSS Inserm)

HCÉRES REPRESENTATIVE

Ms Anne Marie Di Guilmi

REPRESENTATIVES OF SUPERVISING INSTITUTIONS AND BODIES

Mr Olivier Colot, université de Lille

Ms Brigitte Coutois, CHU Lille

Mr Frédéric Gottrand, CHU Lille

Mr Eric Lartigau, CICC Oscar Lambret

Ms Marie-Josèphe Leroy Zamia, Institut thématique des Technologies pour la santé

Mr Yan Pennec, Faculté des Sciences et Technologies, Université de Lille

Ms Benedicte Samyn, Délégation Régionale Nord-Ouest

CHARACTERISATION OF THE UNIT

- Name: Laboratoire de Protéomique, réponse inflammatoire, Spectrométrie de Masse
- Acronym: Prism
- Label and number: Inserm U1192
- Composition of the executive team: Pr Isabelle Fournier/Pr. Michel Salzet, co-directors

SCIENTIFIC PANELS OF THE UNIT

SVE3

THEMES OF THE UNIT

The Prism unit (RNSR 201119484K) is organised around two research pillars, namely "Technological Innovations" and "Therapeutic Innovations", complemented by various platforms and collaborative structures (Imabiotech, Celeos, O'dreams, Ghost-Yale). Prism research is focused on human clinical needs, such as the study of tissue heterogeneity, the development of precision therapy in surgery and immunotherapy. The platforms for service have evolved significantly and has given rise to three platforms (MS4Omics, 3DCellOmics, and VVEDIT) organised under a single structure, OrganOmics, member of the national platform network GIS Ibisa.

HISTORIC AND GEOGRAPHICAL LOCATION OF THE UNIT

U1192 Inserm was created in 2015. It is one of the laboratories of the biology department of sciences and technology at the University of Lille (U Lille). It is located on the first floor of the SN3 building at the campus "Cité scientifique" of U Lille (1,000 m2) and it shares some place (100 m2) with Inserm U1003 on the second floor of this building. U1192 Inserm is also associated with Lille University Hospital (CHU Lille) and the Comprehensive Cancer Center Oscar Lambret (CLCC COL). Prism's supervisory institutions and bodies are U Lille, Inserm, CHU Lille, and CLCC COL.

RESEARCH ENVIRONMENT OF THE UNIT

The Prism unit (RNSR 201119484K) is belonging to the biology department of sciences and technology at the University of Lille (U Lille). Since January 1, 2022, the University of Lille has become an Établissement Public Expérimental (EPE), bringing together eleven components and four member schools (Ensait, Ensapl, ScPoLille and ESJL) to work on major research and education projects (https://www.univ-lille.fr/universite/grands-projets), within the framework of Initiative d'Excellence Université Lille Nord-Europe (I-SITE ULNE), awarded in February 2017 and confirmed in March 2022, to structure a scientific policy centered on Global Transitions with four thematic hubs: (1) Precision health; (2) Science for a changing planet; (3) Digital transition at the service of humankind; (4) Changing cultures, societies and practices. Prism is part of the Precision Health Hub and the graduate school "Biology and Health".
One of the three Prism platforms, MS4Omics comprises also a CNRS platform, MSAP CNRA UAR 3290 Lab). In 2023, MS4Omics was selected to be one of the six nodes of the INBS ProFI, a national network of excellence for proteomics (PIA – France2030 structure).

UNIT WORKFORCE: in physical persons at 31/12/2023

Catégories de personnel	Effectifs
Professeurs et assimilés	6
Maîtres de conférences et assimilés	4
Directeurs de recherche et assimilés	1
Chargés de recherche et assimilés	1
Personnels d'appui à la recherche	8
Sous-total personnels permanents en activité	**30**
Enseignants-chercheurs et chercheurs non permanents et assimilés	4
Personnels d'appui non permanents	5
Post-doctorants	6
Doctorants	13
Sous-total personnels non permanents en activité	**28**
Total personnels	**58**

DISTRIBUTION OF THE UNIT'S PERMANENTS BY EMPLOYER: in physical persons at 31/12/2023. Non-tutorship employers are grouped under the heading "others".

Nom de l'employeur	EC	C	PAR
U LILLE	8	0	6
CLCC LILLE	1	0	7
CHRU LILLE	1	0	2
Inserm	0	1	2
AUTRES	0	1	1
Total personnels	**10**	**2**	**18**

GLOBAL ASSESSMENT

Prism research activities are focused on the development of innovative technologies in the field of mass spectrometry imaging, spatial omics, interatomic, single cell proteomics, and the field of immunotherapy for cancer treatment and precision medicine. The central unifying idea to advancing knowledge and treatment lies in the deep analysis of tissue microheterogeneity and inflammation using state-of-the-art methodologies. This serves as a driving force for breakthrough discoveries, paving the way for improved personalised therapies. The research activity is efficiently organised in two axes: innovation technology axis and therapeutic innovation axis. Prism is a remarkable example of efficient continuum between fundamental research and potential therapeutic applications, benefitting from the strong implications of Lille University Hospital (CHU Lille) and the Comprehensive Cancer Center Oscar Lambret through permanent medical researchers closely associated to technologists. Prism platforms for service are organised under a single umbrella, OrganOmics, member of the national platform network GIS Ibisa, and together with a CNRS platform, contributes to the Lille node of INBS ProFI, national network of excellence for proteomics. The laboratory's influence is reflected in the coordination of numerous national and international projects, outstanding fundraising, increased impact of publications, excellent industrial valorisation, the organisation of conferences and the hosting of numerous young scientists. The unit's scientific prospects are highly relevant, building on past activities while fostering even greater synergy among the various players and stakeholders.

DETAILED EVALUATION OF THE UNIT

A - CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The research unit has made significant efforts to take into account the recommendations from the previous Hcéres evaluation.

Prism has continued its successful strategy in the field of proteomics and mass spectrometry imaging technology as recommended. Prism focused on the development of the SpiderMass technology through projects for clinical validation and cancer and skin diseases applications. Prism has continued and reinforced its translational activity and clinical research within the excellent Lille biomedical research environment.

Prism has attempted to answer the recommendation on the reinforcement of the management of the unit through the recruitment of full-time researchers and/or ATIP or ERC positions. Notably, six positions have been created, reinforcing the research potential of Prism (1 research director, 1 researcher, 2 research associates, 1 research engineer, 1 technician). The newly created positions have not yet matured enough to fully support strong management roles, though certainly contribute to the current dynamism of the research unit and are destined to play a greater role in the future.

Prism has successfully followed the third recommendation to focus its innovative developments in the field of translational medicine, giving full priority to applied clinical programs, based on mass spectrometry imaging, spatial proteomics, and immunotherapy with chimeric antigen receptor modified macrophages.

B - EVALUATION AREAS

EVALUATION AREA 1: PROFILE, RESOURCES AND ORGANISATION OF THE UNIT

Assessment on the scientific objectives of the unit

The assessment on the scientific objectives is excellent to outstanding.
The Prism research unit has set itself ambitious scientific goals in terms of both research and clinical applications. The level of innovation both in terms of methodology and new scientific knowledge for medical applications is remarkable.

Assessment on the unit's resources

The resources of the unit are outstanding.
The Prism unit has the resources to match its activity profile and research environment. In particular, Prism relies on renowned experts, state-of-the-art scientific platforms and equipment, and succeeds in obtaining grants on a regular basis.

Assessment on the functioning of the unit

The functioning of the unit is excellent.
The Prism research unit's operations enable high scientific productivity, excellent methodological demonstration achievements, and a very high level of student training. From what can be evaluated from the received data, Prism complies with regulations on human resources management, safety and ethics, the environment, the protection of data, the protection of intellectual property, and the protection of scientific heritage.

1/ The unit has set itself relevant scientific objectives.

Strengths and possibilities linked to the context

The interdisciplinary Prism unit (Proteomics, Inflammatory Response & Mass Spectrometry) focusses on responding to clinical needs by investigating tissue heterogeneity by mass spectrometry imaging, spatial omics, interatomic, single cell proteomics, proposing innovative immunotherapy for cancer treatment and precision medicine, and participating in clinical trials. The medical interests mainly focus on glioblastoma, breast and gynaecological cancers.

Prism covers state-of-the-art technological innovation (e.g., SpiderMass, TagMass, LTP-MS) together with forefront therapeutic research covering basic science to clinics. The level of innovation both in terms of methodology and new scientific knowledge for medical applications is excellent to outstanding.

The Prism unit (Proteomics, Inflammatory Response & Mass Spectrometry) is organised around two research pillars, namely "Technological Innovations" and "Therapeutic Innovations", complemented by various platforms and collaborative structures (Imabiotech, Celeos, O'dreams, Ghost-Yale).

One of the projects developed in the context of the "Technological Innovations" axis focus on spatial proteomic that allows large-scale protein identification and relative quantification from histological tissue sections. One interesting output is the concept of "Ghost proteome" that refers to the identification of alternative proteins encoded by alternative open reading frames. Another highlight is a technological core composed by the SpiderMass and Snoop-I technologies developed to perform real-time non-invasive analyses devoted to help surgeons for margin detection and decision making.

Precision medicine is the core of the "Therapeutic Innovations" axis in which spatial omics technologies are translated into clinical needs (glioblastoma, breast and gynaecological cancers) with the aims to define the tumour microenvironment, identify biomarkers for diagnosis and prognosis, etc.

The platforms for service have evolved considerably over time to give rise to three platforms (MS4Omics, 3DCellOmics, and VVEDIT) organised under a single umbrella, OrganOmics, member of the national platform network GIS Ibisa. The MS4Omics platform is dedicated to proteomics. The 3DCellOmics is devoted to organoids and extracellular vesicle purification and the most recent VVEDIT platform (emerged in 2023) to genome editing and mainly adeno-associated virus (AAV) vector developments.

The adequacy between Prism internal organisation and the operational implementation of this strategy is excellent. The strong achievements of SpiderMass, CAR-MAC, and Snoop-I technologies over the last years, now entering in clinical phase, allow numerous possible applications and new stages of improvement.

Weaknesses and risks linked to the context

The important successes in terms of grant applications tend to multiply lines of investigation, disperse efforts, and destabilise the ratio of contracted staff versus permanent staff, thus creating possible deficiency in terms of qualified mentoring. The risk of low level of recruitment of permanent support imposed by research institutions and the university is of high concern.

2/ The unit has resources that are suited to its activity profile and research environment and mobilises them.

Strengths and possibilities linked to the context

Prism is associated with Lille University Hospital (CHU Lille) and the Comprehensive Cancer Center Oscar Lambret (CLCC COL), essential to initiate and conduct high quality clinical trials. The strong interactions between Inserm, CHU Lille, and CLCC COL are illustrated by their roles as supervising bodies. Indeed, for more than fifteen years, Prism has established tight collaborations in the field of oncology with clinicians at COL and CHU Lille with the integration of neurooncologists from the Neurosurgery Department. As a result, ten clinicians are members of Prism including surgeons, pathologists, and oncologists. Furthermore, important new expertise for instrumentation development and data treatment is available through new collaborations with Inria. Strong regional interactions are structured with a wealth of local entities through the Organomics platform devoted to local collaborations. Interesting access to conduct pre-clinical studies in animals such as dogs is available through the support of the O'dreams LabCom. Noteworthy, the Prism research unit has the capacity to renovate the premises paid for out of own funds, which ensures a high level of quality in its laboratories and offices.

Weaknesses and risks linked to the context

The current laboratory and office space is particularly limited while the research unit should welcome new instruments, new researchers and students. The forecast important growth phase of projects and the planned structuring of groups means that more space will have to be obtained from the hosting structure in the future.

3/ The unit's practices comply with the rules and directives laid down by its supervisory bodies in terms of human resources management, safety, environment, ethical protocols and protection of data and scientific heritage.

Strengths and possibilities linked to the context

Prism's human resource management is done with respect for gender parity and non-discrimination in training, welcoming, internal mobility and career development for its staff, working conditions, health, safety and the prevention of psychosocial risks, etc.

Accreditations for working on human clinical samples for scientific purpose, BSL2 agreements, GMO agreements, genome editing approval are in place. Security and safety rules and laboratory animation are continuously ensured with a dedicated person. Environment concern is a priority for the unit, as well as the University in general.

Prism has a strong proactive policy promoting students and young researchers for mobility, networking, and responsibilities.

Research unit management, scientific animation, and external communication are well in place with classical laboratory tools.

In terms of scientific integrity, all members of the lab are receiving training through MOOCs. Proteomic and other data are sent to open access repositories on a regular basis.

Weaknesses and risks linked to the context

Regular meetings are held to inform staff and discuss scientific results in an informal manner. However, the sharing of scientific and technological dynamics, enthusiasm, and interests with all staff need to be improved. New arrivals should be planned in advance, their integration facilitated as much as possible by informing all laboratory members in time, and their missions clearly established and regularly re-evaluated throughout their stay.

Prism has not officially organised a Laboratory Council (or Unit Council), a consultative body which regulates the life of the research unit and in which the various laboratory staff categories are represented by elected representatives. This privileged forum for exchanges between the director and representatives of all categories of staff in the unit is sorely lacking, especially as the unit is now of respectable size. Psychosocial risks are dealt without using the tools and services provided by the supervisory authorities. The committee noted that no Inserm F4SCT services have visited the research unit during the period.

The possibilities offered by new digital tools, such as teleworking, are not available to employees.

The excessive workload placed on support staff responsible for administrative tasks (currently 0.6 person instead of usually 1.6 person) is a significant concern that can negatively impact the unit's efficiency. The hosting structure must propose effective solutions to address this issue.

Prism's commitment to quality certification in order to join the Ibisa network and INBS ProFi has not yet been initiated. It is essential to obtain this certification, which will guarantee a durable and efficient organisation.

EVALUATION AREA 2: ATTRACTIVENESS

Assessment on the attractiveness of the unit

The attractiveness of the Prism's unit is excellent to outstanding.
The unit has demonstrated remarkable dynamism in terms of management, responsibilities, scientific expertise and promotion of its work. The team's expertise in the field of Maldi MS imaging technologies contributes to its excellent visibility at local, national, and international levels, confirmed by the high success rate to grant calls.

1/ The unit has an attractive scientific reputation and is part of the European research area.

2/ The unit is attractive because for the quality of its staff support policy.

3/ The unit is attractive through its success in competitive calls for projects.

4/ The unit is attractive for the quality of its major equipment and technical skills.

Strengths and possibilities linked to the context for the four references above

The team's expertise in the field of MALDI MS imaging technologies from the proteomic concept to its translation at the bedside both ex vivo and in vivo -disciplinarity is a unique asset contributing to its excellent visibility at local, national, and international levels.

The Prism laboratory has an excellent scientific influence by the active involvement of some members within local and regional technological research platforms (Cerla, SFR TSM), national or international research network (ART bioprinting, GDR organoids, SFSM, IMSF...). The unit director, his deputy as well as other members received international awards (Slovak Academy of Sciences, Prix Unicancer, Stefanick award/enhanced contribution to bilateral Franco-Slovak scientific and technological cooperation, Medical Sciences Academia-UK). Four members of the unit participate to steering bodies, for example vice chair for the EIC pathfinder (EU), expert for ERC starting grant SVE7, chair of the ERC consolidator panel P2. Researchers have been elected members of the University National Committee (CNU) section n°68. During this contract, the deputy director obtained a five-year senior position at the IUF; she is a member of the Analytical Chemistry SAB review and in the Editorial Board of the International Journal of Mass spectrometry, the director in the BMC Immunology one. The members of PRIM are very active in the organisation of numerous national and international congresses such as the EURON Neuroproteomic workshop, the SFSM 1st virtual congress, the GDR MSI annual meeting and the SMAP 2024 conference. Prism also develops and participates in high quality research national and international networks (e.g., INBS ProFI, O'dreams academy-company common lab, Inserm-Yale University cooperation, etc..). The members of the PRIMS laboratory took part in 130 conferences (in France, Europe, US, Canada, Singapore…) including 48 invited conferences (13 plenary lectures, 15 keynotes, 1 seminar).

During the period, 28 PhDs have been welcomed, all of them from Lille University Master, among whom 4 of them were supported by co-directions with external teams (Lille University, Inria, Gent University. The PhD funding were from different origins including ULille, CHU, Inserm, Regional Council, I-SITE and ANRT Cifre. Thanks to a large number of contracts and positive responses to calls for projects, fifteen postdoctoral researchers have been recruited. A young researcher got a full position as an Inserm associate researcher in 2021. Similarly, an eminent foreign scientist from the Imperial College of London (UK) after three years of support from the I-site, the regional council and MEL on a Brexit Grant got in 2023 a CPJ (chair) at Inserm as research director. The unit also welcomed foreign visiting researcher or professor, from Slovakia (EAL funding) and from the US on a Stanford-France grant, now the IRP funding.

The Prism research unit has excellent ability to take advantage of its research environment and to mobilise resources to support its activity. There was a progressive, but strong increase in obtaining grants over the years, culminating in 2023 with 4.4 M€/year for the research unit. A total of 12,4 M€ in resources (grants & valorisation) have been generated over the 2018-2023 period which is an excellent achievement.

Competitive grants are obtained from ULille Excellence Initiative (I-Site ULNE), the regional council Hauts de France (Start-AIIR, Feder), the state-region plan contract (CPER), the French University Institute (IUF), the ANR, the National Cancer Institute (INCA), Inserm calls (PCSI, Messidor, Booster Programs…), industrial contracts, European (Horizon, MSCA IF, MSCA Doctoral Networks, Permed, EIC Pathfinder) and international (IRP, LEA) programs. More precisely, at the regional level (PIA and regional authorities), the unit obtained 24 contracts, Lille University, I-Site, all coordinated, total amount 4,3 M€. At the national level, the unit obtained 24 contracts, among others: seven ANR (5 coordinated), Plan cancer (4, all coordinated), INCA PLBIO (3, 2 coordinated), Inserm (2, 1 coordinated) for a total amount of 4,3 M€. At the international level, the unit obtained 8 contracts (Era-Permed, MSCA ITN, Intereg, EIC Pathfinder), two coordinators, six partners, total amount 1,45 M€. The unit also obtained funding from foundations (4 contracts, Ligue contre le Cancer, all coordinated, total amount 560 k€) or from industrial partners (15 contracts, Transgene, Servier, SATT Nord, all coordinated, total amount 760 k€) Altogether, the high number of European, industrial, national and local grants obtained confirms a unique positioning of Prism and a high degree of expertise.

Prism has a state-of-the-art mass spectrometry platform with twelve mass spectrometers, five being acquired during the five-year term for its MS4Omics platform (1 TIMS-TOF flex (2023), one Tribrid eclipse (2023), one Xevo G3 (2023), one Xevo G2S (2019), and one Rapiflex Tissue Typer (2018). Interestingly, Prism has a wide variety of research funding sources (>40) to obtain research grants and student fellowships, most being obtained as coordinator/leader. Prism is now recognised as one of the most important MS development laboratories in the EU. Thanks to an effective financing plan that ensures the renewal of its instrumental equipment, Prism now has a very complete range of instruments (sample preparation, separation techniques, Mass spectrometer…).

Weaknesses and risks linked to the context for the four references above

A rather strong bias in terms of funding has been noted, as 75% of the total budget was obtained by only two researchers during the 2018-2023 period. To date, Prism has no coordination of European grants. The unit enjoys an excellent visibility but limited attractiveness (failure of the recruitment of the senior foreign scientist on the CPJ position).

EVALUATION AREA 3: SCIENTIFIC PRODUCTION

Assessment on the scientific production of the unit

The scientific production of the unit is excellent given the number of scientists and the corresponding output in terms of publications in the unit. Some of the publications as mentioned in the section below clearly describe significant innovations in the field over the past contract. There is also an appropriate balance between scientific and clinical application-oriented publications.

1/ The scientific production of the unit meets quality criteria.

2/ The unit's scientific production is proportionate to its research potential and properly shared out between its personnel.

3/ The scientific production of the unit complies with the principles of research integrity, ethics and open science. It complies with the directives applicable in this field.

Strengths and possibilities linked to the context for the three references above

The scientific production of the unit globally meets quality criteria in terms of publications in both fundamental and clinical research domains. Prism has published a total of 261 papers with a nearly equal proportion between scientific and clinical production. Two thirds of them have a first or last author affiliated to Prism. Only 20% include PhD students. Publications include some high-profile journals (2 Nature Comm, 1 Cancer Cell, 1 Cell reports Medicine, 4 Nucleic Acids Research) and more of them are present within the context of international collaborations. Within the major publications one can find evidence of the main scientific highlights of the unit-s production which include the SpiderMass and Ghost Proteome, More specifically the **Nat Comm 2022** concerns the spatial analysis of the glioblastoma proteome revealing specific molecular signatures and markers of survival.), the **Cancer cell 2018** concerns the real-Time molecular diagnosis of tumours Using Water-Assisted Laser Desorption/Ionisation Mass Spectrometry Technology), Finally the **Nature Protocols 2019** concerns a water-assisted laser desorption/ionisation mass spectrometry for minimally invasive in vivo and real-time surface analysis using SpiderMass). Others journal articles that can be highlighted for its innovative aspects concern a second Nature Communications article in 2020 on the development of the SpiderMass technology and two Nucleaic Acid Research articles in 2020 and 2021 concerning Ghost Proteins based in XL-MS for interatomic in GBM. The lab is following the open science policies of the ULille and deposit an openly accessible version of all its publications in HAL. Nearly 25% of the publications of Prism are open access.

Weaknesses and risks linked to the context for the three references above

It is necessary to ensure that all of the researchers of the unit are participating in the publications, particularly as PDC. As it stands most of the publications are associated with a limited number of researchers of the unit.

EVALUATION AREA 4: CONTRIBUTION OF RESEARCH ACTIVITIES TO SOCIETY

Assessment on the inclusion of the unit's research in society

The contribution of the unit to the research activities to society is outstanding.
Prism excels in non-academic interactions, marked by robust industrial collaborations and active patenting and commercialisation efforts. These activities lead to high societal impact through the creation of spin-offs and recruitment of young scientists, truly bridging scientific research with real-world clinical applications.

1/ The unit stands out for the quality and the amount of its interactions with the non-academic world.

2/ The unit develops products for the cultural, economic and social world.

3/ The unit shares its knowledge with the general public and takes part in debates in society.

Strengths and possibilities linked to the context for the three references above

Prism staff is strongly involved in teaching duties at the university. Members of Prism held the responsibility of several teaching units of BSc. and MSc. at ULille in immunology, multiomics and systems biology and in mass spectrometry for chemistry or applied to biology. Noteworthy, Prism members are active for training renewal towards omics, systems biology, computational and statistical methods for omics.

The record of patents and IP protection is excellent. Prism has filed three patents in the past contract period, covering innovations like the LTP-MS setup and interfaces for SpiderMass. These patents are exclusively licensed to Celeos. The first, filed in 2020 and pending, FR3110702A1covers the analysis of VOCs (volatile organic compounds) by low temperature plasma-mass spectrometry. The second and the third, are to protect new interfaces for the SpiderMass and strengthen the initial patent which protects the technology itself. These were filed in 2023, and they are not available online for verification under B21101902FR & B21101901FR, but they must correspond to FR3146017A1 and FR3146016A1.

The record of spin-offs and start-ups creation is strong. Prism has incubated spin-offs such as Celeos and recently Carma, showing a tangible output of its research in commercial ventures. The CEOs of these companies are former Prism PhDs, reflecting the unit's commitment to nurturing entrepreneurial talent. Celeos exploits Mass spectrometry imaging technology (SpiderMass) combined to AI algorithms to compare molecular signatures of in vivo tissue samples. The ambition is to be used during surgery. First clinical trial on human tissues has been financed by Inserm (Messidore 2022). Carma start up is more recent (2023-2024) and will focus on personalised immunotherapeutic approach (CAR-M therapy) based on the identification of the cell surface AltProts specific to breast cancer and other cancers.

The capacity for funding doctoral students with proper resources is noticeable. Prism has secured funding for PhD students through two Cifre and Feder/regional Council, reinforcing the link between academia and industry.

The unit demonstrated opportunity for growth through industry demand and collaborations thanks to significant efforts to increase visibility and niche innovations. Prism's capabilities in areas like real-time DMPK and 3D mixed spheroids have significantly enhanced its visibility and attractiveness to industries, translating into service demand from companies such as Servier, MacoPharma, and Bones Therapeutics. The creation of spin-offs shows Prism's strong capacity to translate scientific research into societal benefits. Ventures commercialise Prism's innovations and contribute to economic growth and job creation, including hiring young scientists from the unit—the CEOs of two of these companies, Imabiotech and Celeos are former Prism PhDs. A strong partnership with Pierre Fabre DermoCosmetics company has been set up to generate proof-of-concept data around the SpiderMass technology. A prototype has been installed at Hôtel Dieu in Toulouse to run since 2023 a clinical trial (NCT04472546) on more than 200 patients with different skin pathologies.

The team shares its knowledge with the public and takes part in societal debates, open lab events, and welcoming high school students raising awareness of science careers. For example, PRIM participates in U Lille's Excur'Sciences project, allowing secondary school students to spend half a day at the MS4Omics platform to explore research careers. Furthermore, both director and deputy used to present Prism's scientific, social and economic activities to the general public at Lions and Rotary clubs. Communication is entertained through the redaction of a Wikipedia webpage and four Youtube blogs.

Weaknesses and risks linked to the context for the three references above

The number of Cifre over the present contract (2) is low relative to the potential of the technological developments and expertise of the laboratory.

ANALYSIS OF THE UNIT'S TRAJECTORY

Prism has long-standing expertise and international recognition in mass spectrometry imaging and spatial proteomics from the technological innovation side, as well as in neuroimmunology and immunotherapy for the therapeutic part. This considerable expertise feeds into the unit's scientific trajectory, which is to address the clinical needs for more efficient patient therapies through personalised medicine by addressing the tissue microenvironment, its heterogeneity, cell to cell crosstalk and the development of novel technologies and biotherapies. Since 2015, Prism U1192 is a single team structured in two research pillars dedicated to technological and therapeutic innovations. For the next contract, and to strengthen the link between the technological developments, the therapeutic innovations and the translational research, the unit will enhance the complementarity between the subjects conducted within the two pillars and the technical platforms. Thus, each pillar will be organised in two WPs and each WP will present a transversality between the two pillars. This organisation is based on five projects (Carma, Cosmix, Neurocan, Nextgenesis, Prodigy) which can be linked to thematic groups within which thematic leaders and staff members are clearly identified. All the projects are based on a clinical question, which requires fundamental developments or studies, but are intended to progressively move down to the translational and then clinical level, offering feedback and interesting outcomes to the end users, patients, and society. Through these projects, Prism, while continuing the research carried out during the previous contract at the very best level, proposes to integrate a broader vision of the cancer models studied by focusing on (i) the characterisation of the tissue microenvironment down to the single cell level while retaining the spatial information (ii) the investigation of the tumour heterogeneity and the role of the sympathetic and parasympathetic nervous systems in the tumour microenvironment, as well as their involvement in metastatic behaviour.

RECOMMENDATIONS TO THE UNIT

Recommendations regarding the Evaluation Area 1: Profile, Resources and Organisation of the Unit

Prism should organise an official Unit Council with elected representatives to improve the exchanges between all staff categories, rely on the tools and services provided by the supervisory authorities especially if psychosocial risks are emerging, organise Inserm F4SCT visits, improve communication and organisation of the research unit in general.

Prism should engage as soon as possible with the quality certification of its main platform. The perimeter of such certification could be the whole research unit, as such certification is an interesting management tool for projects-oriented research management. This certification is a specific requirement that could be necessary for the long-term support of the Ibisa network and INBS, but would also be essential to improve the organisation of the research unit when creating thematic groups. It is essential to obtain this certification, which will guarantee a durable and efficient organisation.

Recruitment and mentoring of young scientists with high potential is highly encouraged. A clear policy of the lab should offer the possibility of scientific and financial independence. All researchers of the Prism unit must have visibility whether national or international, and contribute to the attractiveness of the laboratory.

Recommendations regarding the Evaluation Area 2: Attractiveness

The Prism laboratory should continue efforts to ensure that its attractiveness matches its high visibility. This visibility cannot rely solely on two members of the laboratory. The recruitment of young senior researchers and the emergence of researchers already in place to take the lead in future years must be a priority for the current contract.

Recommendations regarding Evaluation Area 3: Scientific Production

The Prism laboratory should further increase the impact of research. Each new young group leader should demonstrate his or her specific contributions to the scientific output of the research unit, through original experimental work and reviews in his or her areas of activity, and secure long-term resources.

Recommendations regarding Evaluation Area 4: Contribution of Research Activities to Society

The Prism laboratory should continue its efforts to communicate its research activities to society, based on the excellent positioning of its research and is already well-developed experience in this field.

CONDUCT OF THE INTERVIEWS

Date

Start: September 30, 2024 at 8 p.m.

End: September 30, 2024 at 6 p.m.

Interview conducted: on-site or online

INTERVIEW SCHEDULE

8h00 Présentation des membres du comité et du déroulé de la visite.
8h10 Présentation des activités de l'unité.*Michel SALZET, Isabelle FOURNIER*
8h45 Projets « Technological innovations » - *Isabelle Fournier*
9h20 Pause
9h45 Projets « Therapeutic innovations » - *Marie Duhamel*
10h20 Activités de la Plateforme OrganOmics - *Isabelle Fournier & Marie Duhamel*
10h55 Présentation de la trajectoire. *Michel SALZET, Isabelle FOURNIER, Etienne COYAUD, Charlotte DUBOIS*
12h30 Discussion interne comité et déjeuner
13h30 Réunion avec chercheurs et enseignants-chercheurs
14h00 Réunion avec ITA-BIASS
14h30 Réunion avec étudiants et post-docs
15h00 Discussion interne comité
15h30 Réunion avec les représentants des tutelles
16h00 Réunion avec la direction de l'unité actuelle et future
16h30 Finalisation du rapport
18h00 Fin de la visite

PARTICULAR POINT TO BE MENTIONED

N.A.

GENERAL OBSERVATIONS OF THE SUPERVISOR

RÉPUBLIQUE FRANÇAISE
Liberté Égalité Fraternité

Université de Lille

—

Direction générale déléguée
Recherche et valorisation

Les vice-présidents recherche de l'Université de Lille

à

HCERES - Département d'Evaluation de la Recherche

Lille, 28/11/2024

Objet : Courrier d'observation de portée générale Université Lille DER PUR 260024887

Direction générale déléguée
Recherche et valorisation
Direction d'Appui à la Recherche

Affaire suivie par :

Directeur
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dar-structurespartenariats@univ-lille.fr
T. +33 (0)3 62 26 91 35

—

Chère, Cher collègue

L'université de Lille tient tout d'abord à remercier le comité de visite HCERES pour l'attention qu'il a portée au travail mené par l'unité PRISM – Laboratoire de protéomique, réponse inflammatoire, Spectrométrie de masse - et pour la qualité de l'évaluation qu'il a produite.

La visite du comité a été l'occasion, pour les membres de l'Unité de Recherche et pour l'Université, d'approfondir certaines questions et de répondre aux interrogations des experts, dans un esprit constructif dont il faut se féliciter.

Les recommandations émises dans le rapport d'évaluation seront précieuses pour l'unité pour le déploiement de son projet lors du prochain contrat.

Vous trouverez ci-joint un relevé des erreurs factuelles à corriger en vue du rapport définitif.

Nous vous prions de croire, chère collègue, cher collègue, à l'expression de notre considération distinguée.

Pour le Président et par délégation,
Les Vice-Présidents Recherche de l'Université de Lille

Olivier Colot

Sandrine Chassagnard

—
Université de Lille
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From: Prof. Michel Salzet
Director Inserm U1192 PRISM

To the Hcéres committee

Villeneuve d'Ascq, November 21, 2024

Object: Response to HCERES Evaluation Committee
E2026-EV-0597239Y-DER-ER-DER-PUR260024887-SVE3-PRISM-RT

Dear Madam, Dear Sir,

We would like to thank the Hcéres evaluation committee for all the work done, their excellent expertise and the provided recommendations.

Yours Sincerely,

Prof. Michel Salzet

Prof. Michel Salzet
✉ Laboratoire Protéomique, Réponse Inflammatoire & Spectrométrie de Masse (PRISM) – Inserm U1192 – Université de Lille
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