



Research evaluation

EVALUATION REPORT OF THE UNIT
IRM - Molecular ImmunoRheumatology

UNDER THE SUPERVISION OF THE
FOLLOWING ESTABLISHMENTS AND
ORGANISMS:

Université de Strasbourg

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

EVALUATION CAMPAIGN 2022-2023
GROUP C

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High Council for evaluation of research and higher education



In the name of the expert committee¹ :

Anne Caignard, Chairwoman of the committee

For the Hcéres² :

Thierry Coulhon, President

Under the decree n° 2021-1536 of 29th November 2021:

¹ The evaluation reports "are signed by the chairperson of the expert committee". (Article 11, paragraph 2);

² The president of the Hcéres "countersigns the evaluation reports established by the expert committee and signed by their chairperson." (Article 8, paragraph 5).

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: Ms Anne Caignard, Inserm, Paris

Experts : Mr Marie-Christophe Boissier, Université Paris 13 (representative of CSS Inserm)
Mr Didier Busso, Inserm, Fontenay-aux-Roses (supporting personnel)
Mr Stefano Casola, The FIRC Institute of Molecular Oncology, Italy
Ms Hélène Moins, Inserm, Paris (representative of CNU)

HCÉRES REPRESENTATIVE

Ms Anne-Marie Di Guilmi

CHARACTERISATION OF THE UNIT

- Name: Molecular ImmunoRheumatology
- Acronym: IRM
- Label and number: INSERM UMR_S 1109
- Composition of the executive team: Mr Seiamak Bahram

SCIENTIFIC PANELS OF THE UNIT

SVE6 human Physiology and Physiopathology, Ageing

SVE7 Prevention, Diagnosis and Treatment of Human diseases

SVE3 Living molecules, Integrative Biology, Cell and Development Biology

SVE4 Immunity, infection and immunotherapy

THEMES OF THE UNIT

The IRM unit is organized as a single team with several thematic, including 43 faculty members, researchers, teachers-researchers and clinicians-researchers. The IRM unit is focused in translational medicine/molecular pathophysiology of selected immune mediated diseases ranging from rheumatic to cancer and metastasis. The activities include fundamental biology to clinical medicine.

The unit for the next contract is structured in three significant thematic: one axis is Immunology/ Rheumatology/ Genetics, a second relies on Oncology and Inflammation and a third one focuses on Virology and Transplantation. The research activities of the unit are supported by the Genomax and Cytomax platforms managed and headed by two members of the unit.

HISTORIC AND GEOGRAPHICAL LOCATION OF THE UNIT

The Inserm/Université de Strasbourg (Unistra) Unit "UMR_S 1109", called "Molecular ImmunoRheumatology" (ImmunoRhumatologie Moléculaire, acronym "IRM" in french), was created in 2012, by the fusion of two Unistra groups: "Human Molecular Immunogenetics" headed by Pr S. Bahram and "Physiopathology of arthritis". During these 5 years (2012- 2017), the perimeter of the unit was enlarged: the groups "Clinical Virology" and "Immunovirology of HIV" joined UMR_S1109 in 2015 and the genomic sequencing platform "Genomax" was established in 2012.

In 2017, Inserm and Unistra renewed the contract for the INSERM UMR_S 1109 and scientific leadership to Pr S. Bahram. The perimeter of the unit was enlarged with the integration of two groups dedicated to the study of Tumor Microenvironment and Tumor Biomechanisms. In 2020, two groups focused on Clinical Immunology and Inflammation joined IRM. Finally, the flow cytometry platform (Cytomax) was installed in 2021.

At the end of 2021, INSERM UMR_S 1109 was split between 3 different locations: (1) The Hematology and Immunology Research Center continues to host the groups involved in the Theme "Immunogenetics and Rheumatology. It also houses the 2 infrastructures of the unit, i.e., the Genomax and Cytomax platforms as well as animal facilities; (2) The Virology Institute houses the Theme "Virology and Transplantation" groups with access to the unique Biosafety Level 3 (BSL3) biocontainment facility and (3) the "Biomedicine Research Center of Strasbourg" (CRBS) (CRBS - Centre de recherche en biomédecine de l'Unistra) opened in 2020 hosts the groups Tumor Biomechanisms and Autoimmunity as well as part of the group of Pr Seiamak Bahram. The unit has always adopted the configuration "Unité Mono-équipe/Plurithématique".

RESEARCH ENVIRONMENT OF THE UNIT

The IRM unit is a research unit of Unistra located in the central medical campus. IRM is involved in several regional PIA: one is the Labex Transplantex (2011-2020) renewed as Institut Thématique interdisciplinaire (ITI) (2021-2029) and funded by the Idex Unistra, the second is SFRI (Structuration de la Formation par la Recherche dans les initiatives d'excellence). One team is also partner of the Idex VRI Vaccine Research from Unistra. The director is the initiator of the PACIFIC (Patient-centered institute for IMIDs care) institute project of IHU. The unit founded 2 federations: the Strasbourg foundation of translational medicine (FMTS) and the FHU OMICARE (Omics and Care). Finally, the Genomax platform is integrated in two national networks for infrastructures (France Génomique and IBISA)

UNIT WORKFORCE: in physical persons at 31/12/2021

Permanent personnel in active employment	
Professors and associate professors	19
Lecturer and associate lecturer	18
Senior scientist (Directeur de recherche, DR) and associate	3
Scientist (Chargé de recherche, CR) and associate	4
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	24
Subtotal permanent personnel in active employment	68
Non-permanent teacher-researchers, researchers and associates	28
Non-permanent research supporting personnel (PAR)	16
Post-docs	5
PhD Students	28
Subtotal non-permanent personnel	77
Total	145

DISTRIBUTION OF THE UNIT'S PERMANENTS BY EMPLOYER: NON-TUTORSHIP EMPLOYERS ARE GROUPED UNDER THE HEADING "OTHERS".

Employer	EC	C	PAR
Université de Strasbourg	36	0	13
Inserm	0	6	7
CHU Strasbourg	1	0	4
CNRS	0	1	0
Total	37	7	24

UNIT BUDGET

Recurrent budget excluding wage bill allocated by parent institutions (total over 6 years)	2 573
Own resources obtained from regional calls for projects (total over 6 years of sums obtained from AAP index, i-site, CPER, territorial authorities, etc.)	1 823
Own resources obtained from national calls for projects (total over 6 years of sums obtained on AAP ONR, PIA, ANR, FRM, INCa, etc.)	9 025
Own resources obtained from international call for projects (total over 6 years of sums obtained)	2 498
Own resources issued from the valorisation, transfer and industrial collaboration (total over 6 years of sums obtained through contracts, patents, service activities, services, etc.)	2 505
Total in euros	18 424

GLOBAL ASSESSMENT

The global assessment of IRM is excellent to outstanding. The IRM unit, through its long-term development, has gathered remarkable researchers with complementary skills and competence. IRM obtained massive funding required for its research activity. The committee outlines however that the unit displays a complex organization, since it is defined as a mono-team but with distinct research programs not all fully connected.

The high quality of basic and translational research, the implementation and effective functioning of state-to-the-art technological platforms, the strong fundraising performance and the awarding of unit members with several prestigious prizes acknowledge the remarkable attractiveness of the unit.

The scientific production in terms of quality and quantity is excellent.

The IRM has developed significant interactions with hospitals, including a structuration of hospital research (FHU). The IRM has established strong scientific and technological partnerships with industries that generate funding for developing projects and recruiting people.

Several members of the IRM unit are present in media for frequent scientific communications.

DETAILED EVALUATION OF THE UNIT

A - CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

-more papers in higher impact journals to increase further international impact and visibility of work

In the last period, the unit have produced 13 papers in eminent journals, all with corresponding positions: *Blood*, 2016, *JCI*, 2017, *Ann Rheuma Dis* 2018, *Dev Cell*, 2019, *JACI*, 2019, *JEM*, 2020; *EMBO J*, 2021, *JAMA* 2021, *Sci Transl Med* 2022 and *Nat Med*, 2022 and 2 review (1 in *Science*, 1 in *Nat Rew Cancer*).

-increase the national and international reputations the unit by developing new strategic partnerships to enhance access to patient cohorts, novel models, technologies.

Several patient cohorts with auto-immune diseases have been constituted: Lupus Biobank of Upper-Rhine (LBBR) comprising 1300 lupus patients and the French arm of the Clinnova initiative (L'intelligence artificielle au service de la santé).

The BioValley France (biovalley-france.com), a trinational (France, Luxembourg, Germany) initiative to advance the diagnosis and treatment of immune-based disease has been launched.

The unit is member of the LabEx TRANSPLANTEX. The local biobank is headed by Pr S. Caillard.

Large cohorts of HIV ("Elite controllers" and "HIV progressors") and BK virus infected patients (Dr C. Moog and Pr S. Fafi-Kremer) have been established.

In the cancer field, a cohort of 300 familial LLC patients is studied at the whole exome level. The unit has also access to patient samples available at the regional cancer center (ICANS - Institut de cancérologie Strasbourg Europe).

The genomic platform GENOMAX (see GENOMAX (unistra.fr) has recently been labeled by France Génomique (France genomique.org) and IBISA. It performs fee-for-service activities.

A recent CYTOMAX platform with a 5-laser spectral analyzer (CyTek) and a 5-laser cell sorter (CyTek) is running since 2021.

The unit has obtained two European INTERREG project grants, Tridiag and Personalis and it collaborates with the local SATT Conectus.

Several unit members are highly involved in interaction with the general public, "fête de la science" or on social networks i.e. Twitter (@GoetzJacky).

The unit has trained 25 PhD students, 11 post-doctoral fellows and has established innovative programs like the yearly "Transplantex summer school" renewed by the Labex.

-focus on research areas of strength to perform in depth investigations that will have a high impact internationally - identify topics where cross theme collaborations could bring a unique additional element.

Many papers result from the collaboration of at least 2 groups of the unit: 5 articles shared by the Bahram/Carapito and Goetz groups; 6 co-authored by Bahram and Moog; 5 by Bahram and Fafi-Kremer and 2 by Carapito and Korganow; the Orend group collaborated with the Genomax platform (Carapito), producing 4 common papers and obtained common funding.

B - EVALUATION AREAS

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

Assessment on the unit's resources

Human, technological and funding resources are excellent to outstanding. The unit has gathered important financial resources from regional, national and European agencies that are required for its activity focused in translational medicine and molecular pathophysiology of selected immune mediated diseases, which allows the unit to maintain a solid position in the research environment.

Assessment on the scientific objectives of the unit

The scientific objectives set by the unit are excellent. Numerous and diverse research projects are run on the genetics and pathophysiology of immune and inflammatory diseases (cancer, immune mediated, virus induced disease).

Assessment on the functioning of the unit

The unit provides an excellent technological and infrastructure support to the research and a good human resource management.

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

Strengths and possibilities linked to the context

The IRM unit totalized in december 2021, 120 personels: 43 faculty members among who 28 with both university and hospital appointments (14 PU-PH and 14 MCU-PH), 3 PU, 5 MCU, full time researchers (3 DR, Inserm, 3 CR Inserm and 1 CR CNRS), 11 post doc, 25 PhD and 9 M2 students. The unit benefits from 3 research engineers, 15 IE and AI, 10 technicians, 2 administrative staff. Along the previous contract, the unit acquired several positions: 2 associate Pr (MCU-PH), 2 engineers (IR), 1 IE (Inserm, 1 Unistra), 2 researchers (Inserm, CNRS).

The total amount of resources obtained by the PI is about 30 M€. The largest part is represented by the Future Investments Programs (PIA, 12,28 M€), among which Labex Transplantex (5,5 M€) and ITI Transplantex (6,3 M€) coordinated by the unit director. There is an equal repartition between the 3 thematics, these funds are merged with recurrent resources from Inserm and Unistra. Among the recurrent dotations, 20% is dedicated to common expenses. The fundings obtained by individual PI are not mutualized. Each group has already secured several grants for the coming contract. Significant external resources are also received from national programs, ANR (8 contracts, 3 coordinated by the unit, total amount 2,27 M€) and ANRS (3 contracts all coordinated by the unit, total amount 412 k€). Cancer related projects were funded by INCa, Plan Cancer and Ligue contre le Cancer agencies (11 grants among which 4 held by the unit, total amount 2,49 M€).

Several European funds are obtained by PIs of the unit on specific programs like the Interreg France-Wallonie-Vlaanderen for a total amount of 706 k€ and Horizon 2020 (389 k€). In the former period, several members of the unit obtained 7 industrial contracts, including the Atogen contract with MDS AVenir (2018-22: 2,7 M€). One start up BIOMICA was created and run during the period 2011-2021.

Weaknesses and risks linked to the context

The overall organization of the unit is complex. Considering its important size (more than 100 members) and the spread localization of the groups in different buildings make the communication between members of the groups not optimal. How each group, as a scientific force, benefits from the Unit, and how they contribute to the unit global scientific politics is sometimes unclear. The presentation of the IRM unit research activities and its platforms do not appear on the web site of Unistra which complexifies the understanding of the unit organization. The added value of a single team unit is not obvious considering the scientific politics of the different groups/topics of the unit.

2/ The unit has set itself scientific objectives, including the forward-looking aspect of its policy.

Strengths and possibilities linked to the context

The unit global aim is focused on the genetics and pathophysiology of immune and inflammatory diseases (cancer, immune mediated, virus induced disease) and thus gather the 3 main distant topics of the unit Scientific strategy is discussed during weekly lab boards including groups leaders. The IRM has established long terms interactions with local partners from Unistra (Institut Interdisciplinaire Hubert Curien). The IRM has built many international scientific collaborations, among which Boston (Genuity Science), Freiburg (programs on Chronic

immune deficiencies) and participate in technological development on high throughput multi-omics processes with Teheran, Tokyo, Harvard. These actions are in line with the Inserm strategic plan 2025 Calameo and the Cap 2030 objectives of Unistra. IRM shows its strong commitment to societal issues through the PACIFIC (Patient-centered institute for immune-mediated inflammatory disorders care) health project in which physicians, researchers and biotech/pharmaceutical companies will work together in close relationship in a new building planned for 2026.

The IRM has elaborated 7 patents originated from its own scientific research, including a patent on a molecular signature of patients at risk of severe SARS infection, a patent on MICA genotyping for donor/recipients of organ transplants, 2 patents related to the role of Tenascin-c in cancer (generation of Anti-Tenascin-C single domain antibodies and identification of compounds binding Tenascin-C) and one patent related to a new vaccine with a vaginal microbiota antigen inducing a mucosal neutralizing protective antibody response against HIV infection.

The IRM has been engaged in the creation of BIOMICA SAS, a start-up company to evaluate risk of graft rejection in transplantation, based on the MICA/B genes, now sold to a world leader in the transplantation domain. It is of note that the IRM unit has contacts with Biotech and BigPharma companies, such as Transgene, Novartis, Roche, Sanofi.

Weaknesses and risks linked to the context

Although large and plurithematic, the IRM unit is presented as a single team which makes the global scientific objective difficult to understand. Unconventionally for a mono-team unit, the structure gathers several groups that develop independently from the others groups, numerous and diverse research projects. The platforms may be however considered as the link between the different groups. Within this organization, it is somehow difficult to identify the main scientific questions addressed by the whole unit, nor the eventual breakthrough in the strategy or even the goal of the major developed research programs.

3/ The functioning of the unit complies with the regulations on human resources management, safety, the environment and the protection of scientific assets.

Strengths and possibilities linked to the context

The unit follows the rules of human resources management from Unistra and Inserm. In terms of parity, among all unit members, 67 are females and 53 are males; among the 9 PI, 4 are female and 5 are males. There is a checklist with key actions signed at entrance and departure of all staff members. There is a safety officer to analyse each year the safety rules with the director. This officer can be contacted in a confidential manner if needed. Continuity plans established by Unistra and Inserm are followed.

All major equipments are insured by a private company. All current recommendations are implemented for use of chemical/biological/hazardous materials. Staff members are encouraged to pay attention to eco-system/planet. For example, reaching the lab by public transport or personal vehicle except car whenever possible is encouraged ("boulot à vélo" challenge organized by several members of the unit).

There is a computer back up system on a daily base to save the data. Antiviral protection on all computers as well as personal computers are equipped with anti-virus softwares. Two persons of the unit are correspondents with the IT service of Unistra and or Inserm. A global WhatsApp group (on voluntary basis) has been created to facilitate informal communication between the unit members.

Full staff assist to the weekly seminars hold on Thursdays, at the end of which the director opens the floor for questions. A summer school, yearly unit meeting and seminar where each person presents its work are organized both at the unit and at the group's levels.

Weaknesses and risks linked to the context

The organization of regular thematic or technical meetings or training of students and post doc are not reported. During the meeting with the ITA staff, it has been said that the access to external formation is not encouraged by the unit direction.

EVALUATION AREA 2: ATTRACTIVENESS

Assessment on the attractiveness of the unit

Attractiveness of the IRM unit is excellent considering the scientific reputation, the success in gathering funds from national and regional agencies and hosting students. The contribution of the unit to the European research area remains however lower than expected. The state-of-the-art equipment and technological skills implemented in the unit deserve to be more visible and accessible to the community.

1/ The unit has an attractive scientific reputation and contributes to the construction of the European research area.

Strengths and possibilities linked to the context

Since its establishment in 2012, the INSERM UMR_S 1109 "Molecular Immuno Rheumatology" (IRM) unit has been able to progressively attract new high-profile research and clinical groups. The implementation of state-of-the-art genomics and flow cytometric technological platforms have increased the visibility of the unit.

Both research and clinical members of IRM are regularly invited to present their work at national and international conferences (including Keystone symposia), workshops and annual meetings of medical societies focusing on immunogenetics, rheumatology, cancer metastasis, matrix biology and HIV biology topics, acting in three instances as plenary/keynote lecturers. Members of IMR are engaged in the organization of yearly trans-national immunopathology meetings dedicated to German/French graduate students and medical doctors.

Several IRM members hold editorial responsibilities in peer-reviewed specialist research and medical journals including *Frontiers in Immunology*, *American Journal of Physiology-Cell Physiology and Rheumatology* and *Autoimmunity*.

IRM senior members take active part in several national research steering committees and contribute to the evaluation of research activities at the international level, providing scientific expertise to major European (i.e., European Research Council) and USA (i.e., National Institute of health) funding agencies. Members of the unit belong to international scientific bodies reaching in some instances executive levels (i.e., European Lupus Society).

Several IRM senior members are (or have been) board members of national (i.e. French Society of Cell Biology, Immunology, Matrix Biology; Arthritis Courtin Foundation) and international (International Society of matrix biology; French/German Lupus biobank) learned societies and foundations. For their achievements, unit members received several national and international prizes including the 2020 Prix de l'Académie de Médecine and the 2019 Abu Reyhan Biruni Research Award (Iran), the 2020 Prix Ruban Rose Avenir and the 2020 Grand Prix de Cancérologie de la Fondation Del Duca and the 2019 Prix Sciences de l'Académie Rhénane.

Weaknesses and risks linked to the context

Except for the co-organization of two international HIV workshops/satellite meetings, the IRM unit has yet to participate to the organization of major international and European congresses.

Despite strong scientific productivity and solid national and international funding, including EU-based research and clinical programs, none of IRM unit members has (surprisingly) so far succeeded to be awarded with prestigious European Research Council starting/consolidator/advanced grants.

The participation of unit members to editorial activities in generalist journals is yet to be achieved.

The ability of IRM to attract young promising scientists from other European countries and worldwide is limited.

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

Strengths and possibilities linked to the context

The INSERM UMR_S 1109 provides high quality environment with the respect of scientific probity or integrity for staff scientists, technical staff, students and post-doctoral fellows.

The scientists present their work in international conferences on a regular manner and several internal meetings are organized giving a well-established scientific environment for researchers beginning their career.

The unit has the possibility to offer permanent positions for new staff scientists.

The unit obtained important fundings allowing to perform appropriate research and maintain or replace quite expensive equipment. Moreover, the unit is able to provide adequate working space and scientific environment with the respect of scientific policies for all the staff as well as for renowned guest researchers.

Several awards and prizes have been obtained by students and young scientists reflecting that they work in good conditions and have the benefit of appropriate supervision. Eight Ph.D students received prizes from charity foundations and scientific societies. The activity of young researchers has also been recognized through awards like the Prix Espoir de la Recherche de l'Université de Strasbourg, Prix Sciences de l'Académie Rhénane, Prix Christian Nezelof - IMAGINE en Pathologie pédiatrique.

Weaknesses and risks linked to the context

Even if the unit organizes several internal meetings and the unit director intends to provide a scientifically intense yet humanly relaxed atmosphere, students do not always dare to express themselves when supervisors, directors, foreign scientists are present in the audience. Moreover, it is sometimes stressful to discuss about difficult experiments or those that failed. Thus, to pursue the already work done to create environment and supervision providing good working conditions, meeting and discussions between students/ITA are missing. Such meetings, on a regular basis, like a forum where one student shares his/her work, without any restraints, to other students to discuss about difficulties and/or positive experiences may be useful.

3/ The unit is attractive because of the recognition gained through its success in competitive calls for projects.

Strengths and possibilities linked to the context

IRM members have succeeded to ensure substantial funding from international agencies including the Worldwide Cancer Research (one contract, partner, 206 k€), the HIV Vaccine Trials Network (HVTN, one contract, partner, 60 k€) and the Spanish research agency (one contract, partner, 40 k€), Several European fundings were obtained on specific programs including the Interreg France-Wallonie-Vlaanderen for a total amount of 706 k€ and Horizon 2020 (389 k€).

IRM has secured funding for two major Future Investments Programs coordinated by the IRM director: the Labex Transplantex (2011-2020), which has now evolved into the Institute of Precision Medicine "Transplantex NG" (2021-2029) devoted to the study of allo- and auto-immune diseases. Through Idex Unistra, the unit is also granted regular funding to cover part of the salaries of graduate and postgraduate students and of the 32 PhD students.

IRM members hold 12 ANR grants (five of which acting as coordinator) and funding from Institut National du Cancer, Plan Cancer, Ligue contre le Cancer (in total 11 grants of which 4 as coordinators), Agence Nationale contre le Sida (5, all as coordinators) and the Programme Hospitalier de Recherche Clinique. In addition to funding from ANR, unit members have received numerous funding to support research activities and salaries of graduate students from different charities and associations including FRM, ARC, the Arthritis Foundation, the French Scleroderma patient association (ASF), the Fondation Pierre Bergé and the Fondation de France. Thanks to the strong fundraising ability, laboratory heads within IRM are in the possibility to cover the salaries of many of their non-permanent members, including graduate students, post-doctoral fellows, engineers and technicians. Moreover, through local and national funding schemes and earnings coming from fee-for service activities, IRM has been able to guarantee the continuous updating and expansion of the Genomax and Cytomax technological platforms and the growing demand for bioinformatics support by new hiring.

Weaknesses and risks linked to the context

Approximately 50% of the total funding raised by IRM from 2013 will be expired by 2022 (from ~30 to 15 million Euros). The major funding secured so far (~ 6.3 million Euro) for the incoming years (till 2029) was obtained by the unit director through the Transplantex initiative, representing roughly 40% of all funding secured by senior IRM members for the next 1-4 years. Although the strong track record in fund raising represents a guarantee for securing future funding, additional financial support will be needed to sustain full-force the current and prospective research activities run by scientists and clinical researchers of the unit. To what extent funding through the Transplantex initiative supports the science of individual IRM laboratories is ill-defined.

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

Strengths and possibilities linked to the context

The major equipment of the Unit UMR_S 1109 are hosted by the platforms Genomax and Cytomax empowered with latest high-end machines run by highly competent and dedicated staff. Thus, the Unit has the technological expertise required to perform genomic/transcriptomic projects including sequencing and single-cell experiments including the crucial steps of data storing and data analyses with dedicated bioinformaticians and biostatistician. Besides academic incomes, at least Genomax platform has established collaborations with partners and provided services to industrial in order to collect fundings. The knowledge and state-to-the art skills of the platforms staff are recognized by a large number of scientific publications where the platforms' staff is often listed as co-author(s).

Weaknesses and risks linked to the context

Even if the platforms have been implemented to contribute to internal projects, the fact that at least Genomax is labelled by the Canceropole and Ibisa programs means that it should be opened to external users. Nevertheless, none of the platform has a dedicated web page where equipment, services, prices and staff are depicted. This matter-of-fact can be detrimental for teams potentially interested in using skills and equipments from these platforms.

Although home-made tools are used for storing data, it would be important to develop or implement a laboratory integrated management system (LIMS) shared by all unit members and dimensioned to store data generated by the platforms. Such a LIMS will participate to the scientific integrity policy.

Bioinformatics support could soon become a bottle-neck since considerable amount of complex datasets are continuously and probably increasingly generated by the highly technological platforms Genomax and Cytomax as well as the in vivo imaging performed in pre-clinical models.

EVALUATION AREA 3: SCIENTIFIC PRODUCTION

Assessment on the scientific production of the unit

Scientific production is outstanding with the publication of numerous articles in eminent journals.

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

Strengths and possibilities linked to the context

During the 5 past years, the Unit has published in high profile journals (*Nature Medicine, Science Translational Medicine, J Exp Med, JCI, JAMA, Dev Cell, Ann Rheum Dis, Cell Rep, JACI...*). Articles published by the unit meet high quality criteria, some of them are highly cited (ex: 103 citations for a paper published in 2018, with a Ph-D student as first author).

As recommended by the previous Hcéres evaluation committee, the scientific production has been increased: 360 research papers published from 2016-2021 period with 25 coming from the collaboration between at least 2 groups of the unit; the record also includes 316 clinical papers and 104 reviews. As stated on December 2021, all students have published papers as first author. Data from the team director are mainly based on powerful methodological approaches generated by the platform "Genomax." Combined with the constitution of patient

cohorts (auto-immune, transplanted, HIV or LLC patients), this strategy allows the production of numerous scientific publications based on systematic screenings. The recently developed spectral cytometer platform Cytomax reinforces such method.

From 2012-2017 to 2017-2022, the perimeter of the unit was enlarged by the integration of oncology and virology thematics. Several preclinical models have been created based on internal clinical findings, which allowed the publication of studies more based on functional hypotheses. Overall, the scientific production makes a significant contribution to knowledge.

Weaknesses and risks linked to the context

Although patient cohorts are carefully selected upstream, the so-called “fire of power”, as the technical resource and the high throughput platforms implemented are qualified by the unit director might not be considered sufficient *per se*. The research projects should also be conducted with upstream hypotheses and data should support the emergence of innovative themes and/or high-risk research.

2/ Scientific production is proportionate to the research potential of the unit and shared out between its personnel.

Strengths and possibilities linked to the context

The scientific production is definitely well proportionate to the research potential. This is supported by strong methodologies, large patient cohorts and competent technical staff with adapted skills. The recommendation of publishing more papers in higher profile journals in the previous Hcéres assessment has been largely met.

Weaknesses and risks linked to the context

All the tenured scientists are actively participating in the scientific production of the unit. However, it has to be pointed out that a large number of publications are signed by the director of the unit as last author, and more specifically those with the highest impact factor. This mirrors the overall structure of the unit, presented as “Unité mono-équipe” with a pyramidal construction. Attention should be paid to let the emergence of other scientists as PI.

3/ The scientific production of the unit complies with the principles of research integrity, ethics and open science.

Strengths and possibilities linked to the context

Every researcher is asked to ensure the traceability of her/his results by using a laboratory notebook. An internal server is dedicated to immaterial data and archives are made on a daily basis.

Experimentation are conducted with respect to the Inserm directives. A structure for the well-being of animals, composed of researchers and technicians and supervised by a veterinarian has been set in the unit.

Weaknesses and risks linked to the context

There is neither organized policy nor training regarding research integrity, more specifically how to deal with the occurrence of false data produced by a student or a researcher. Traceability of data has to be improved, the use of electronic laboratory notebook is not yet implemented in the unit.

EVALUATION AREA 4: CONTRIBUTION OF RESEARCH ACTIVITIES TO SOCIETY

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

The inclusion of the unit research activities in society is excellent to outstanding. This is revealed by the strong interactions with the university hospital to elaborate innovative translational research programs and constitution of cohorts, fruitful collaboration with industry leading to funding and patents. The unit develops an active communication with general public, and has been strongly involved during the Covid crisis.

1/ The unit stands out by the quality of its non-academic interactions.

Strengths and possibilities linked to the context

The unit displays constitutive interactions with University Hospital (CHU Strasbourg). Several PUPH and MCUPH (professors or associate professors of medicine with hospital duties) are members of the unit, mainly involved in the themes Immuno-rheumatology and virology-transplantation. This position enhances the possibilities of accurate translational research strategies and facilitates the recruitment of patients, the access to samples, collections, cohorts. The director of the unit is also the leader of a FHU (Hospital Federation in CHU). Some interactions also exist with Region Alsace (doctoral contract) and with the City of Strasbourg (member of scientific council).

Weaknesses and risks linked to the context

The research programs related to in rare and/or auto-immune diseases might be improved if the highly experienced clinicians were more involved in the general strategy of the unit.

2/ The unit develops products for the socio-economic world.

Strengths and possibilities linked to the context

In continuity with the scientific objectives, the IRM Unit develops fruitful collaborations with industrial groups that contribute to significant funding. These include for example the program AUTOGEN (2.7 M€) developed with MSD-Avenir funds which aims at providing 1000 exomes from auto-immune diseases patients. Partnerships with Biomérieux, Biotest and Biosynex Several have been launched on medical virology. Multiomics data analysis by artificial intelligence is investigated in association with Genuity Science (Boston) which results so far in a publication in *Sc Transl Med* and 2 patents.

The valorization process run by the unit relies in on the SATT environment. It is of note that the unit conducts an active policy to protect intellectual property. The autoevaluation document mentions 7 patents with a special importance given to the most recent one, a European patent "A new non-HIV vaccine antigen, from the vaginal microbiota capable of inducing a mucosal neutralizing protective antibody response against HIV infection" registered in Aug. 2021.

A Start-up has been created with researchers of the unit: BIOMICA (co-founder Bahram/Carapito), closed in 2020, and licensed to a leader in HLA typing. Genomax platform provides services for external partners, in RNA seq and exome sequencing. All together, these features demonstrate a good match between the technology readiness level attained and the expectations of companies and a wish to transfer technology (and protect it).

Lastly, a Cifre Doctoral contract was obtained for one PhD student. The unit hosted two Sanofi employees (paid by Sanofi) during one year in the 2019-2020 period.

Weaknesses and risks linked to the context

General strategy to attract private fundings should be more visible, even for people within the unit. It is not clear to what extent the funding resulting from platform functioning is dedicated to the research activity of the unit, for elucidation of some mechanistic aspects of diseases studied in the three topics.

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

Strengths and possibilities linked to the context

Several unit members have been asked to share their scientific experience during general public events. Participation of researchers and MD in socioeconomic meetings is attested, like a Plenary seminar at the World Bank (Precision Medecine), the presence at the Forum Européen de Bioéthique, and a talk given in Strasbourg organized by Biovalley (Meet & Match Immuno-oncology).

Unit members somehow participate to mass medias communication, such as radios, local newspapers, as well as in Inserm and Unistra specialized channels. Young researchers (PhD students) participate in general manifestations, like the Fête de la Science.

Members of the unit have participated to consultancy meeting with the Mayor staff of Strasbourg during the Covid 19 pandemia. Some MD participate in dissemination of knowledge and information of patients associations. Members of the unit, with a particular engagement of young researchers (PhD students) in citizen science open activities: fêtes de la science, night of immunology. They are also present for teenagers (schools, associations) to promote research.

Weaknesses and risks linked to the context

The presence in mass media and, more generally, in sharing with the general public could be increased and diversified to communicate the whole spectra of the unit research activities.

C - RECOMMENDATIONS TO THE UNIT

Recommendations regarding the Evaluation Area 1: Profile, resources and organisation of the unit

The members of the committee encourage the unit to favor more contacts and to improve communication between the different groups. The committee recommends that the unit should define a global and harmonized strategy for the research conducted by the different groups. Group leaders should be more involved within the direction board to define the global scientific strategy of the unit. This form of management should increase their visibility. The unit should organize a formalized Laboratory Council, which is mandatory in this complex structure.

Recommendations regarding the Evaluation Area 2: Attractiveness

The unit should consider hiring future investigators on topics that will represent mainstream programs in the next 5-year period to reinforce current successful programs. It is also recommended to actively scout for prospective highly-promising young researchers to be hired, with strong track record and scientific potential to be awarded by prestigious international grants such as ERC. Expanding the recruitment of foreign students and post-docs would improve the international attractiveness. Altogether, the unit would benefit from recruiting junior investigators and talented post docs to develop new fundamental and mechanistic research activities in the area of immuno-rheumatology. The unit should also consider capitalizing on the strong expertise and recognition of the PIs from the newly included topics and the promising issues of the research programs.

Recommendations regarding Evaluation Area 3: Scientific Production

No specific recommendation is proposed due to the outstanding quality of the scientific production.

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

The members of the committee consider that the unit should better define the objectives of seeking fundings from industry, in relation with research purposes. The unit should have a website, regarding its size and its large range of research themes.

CONDUCT OF THE INTERVIEWS

Date

Start: 11st October 2022 at 09:00

End: 11st October 2022 at 19:30

Interview conducted: online

INTERVIEW SCHEDULE

9h – 9h30	Committee pre-start meeting <i>Closed-door meeting</i>
9h30 – 9h35	Hcéres Rules and procedures by A.M. Di Guilmi <i>Public Session (all unit members)</i>
9h35 – 10h25	Administrative and scientific presentation of the unit by the director 30 min presentation + 20 min discussion <i>Public Session (all unit members)</i>
10h30 – 12h00	Scientific presentations by group leaders 10 min presentation + 10 min discussion <i>Public Session (all unit members)</i>
10h40 – 11h00	Theme Immunology/Rheumatology. Seiamak Bahram (Director)
11h05 – 11h25	Theme Oncology and Inflammation. Jacky Goetz
11h30 – 11h50	Theme Virology and Transplantation. Samira Fafi-Kremer
11h55 – 12h15	High throughput Biology. Raphael Carapito
12h15 – 12h45	Debriefing-1 committee <i>Closed-door meeting</i>
12h45-13h30	Lunch Break
13h30 – 14h15	Meeting with ITAs (in French). Split committee <i>In the absence of any managing staff (DU, team leaders)</i>
13h30 – 14h15	Meeting with post-docs and PhD students. Split committee <i>In the absence of any managing staff (DU, team leaders)</i>
14h15 – 15h00	Meeting with researchers. Full committee <i>In the absence of any managing staff (DU, team leaders)</i>
15h00 – 15h40	Meeting with institution representatives: INSERM/University of Strasbourg <i>Closed-door meeting</i>
15h40 – 16h00	Debriefing-2 committee <i>Closed-door meeting</i>
16h00 – 16h30	Meeting with the unit director <i>Closed-door meeting</i>
16h30 – 19h30	Redaction of the final report <i>Closed-door meeting</i>
19h30	End of the interview

GENERAL OBSERVATIONS OF THE SUPERVISORS

Université

de Strasbourg

Monsieur Éric Saint-Aman
Directeur du Département d'évaluation de la recherche
HCERES - Haut conseil de l'évaluation de la recherche et
de l'enseignement supérieur
2 rue Albert Einstein
75013 PARIS

Strasbourg, le 9 juin 2023

Objet : Rapport d'évaluation DER-PUR230023190 - IRM - Immuno-rhumatologie moléculaire

Réf. : RB/FF/ 2023-371

Rémi Barillon

Vice-Président Recherche,
Formation doctorale et Science
ouverte

Cher Collègue,

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L'Université de Strasbourg vous remercie ainsi que tous les membres du comité HCERES pour le travail d'expertise réalisé sur l'unité de recherche « Immuno-Rhumatologie moléculaire » (IRM - UMR_S 1109).

Nous n'avons aucune observation de portée générale à formuler sur le rapport d'évaluation transmis.

Je vous prie d'agréer, Cher Collègue, l'expression de mes cordiales salutations.

Rémi Barillon



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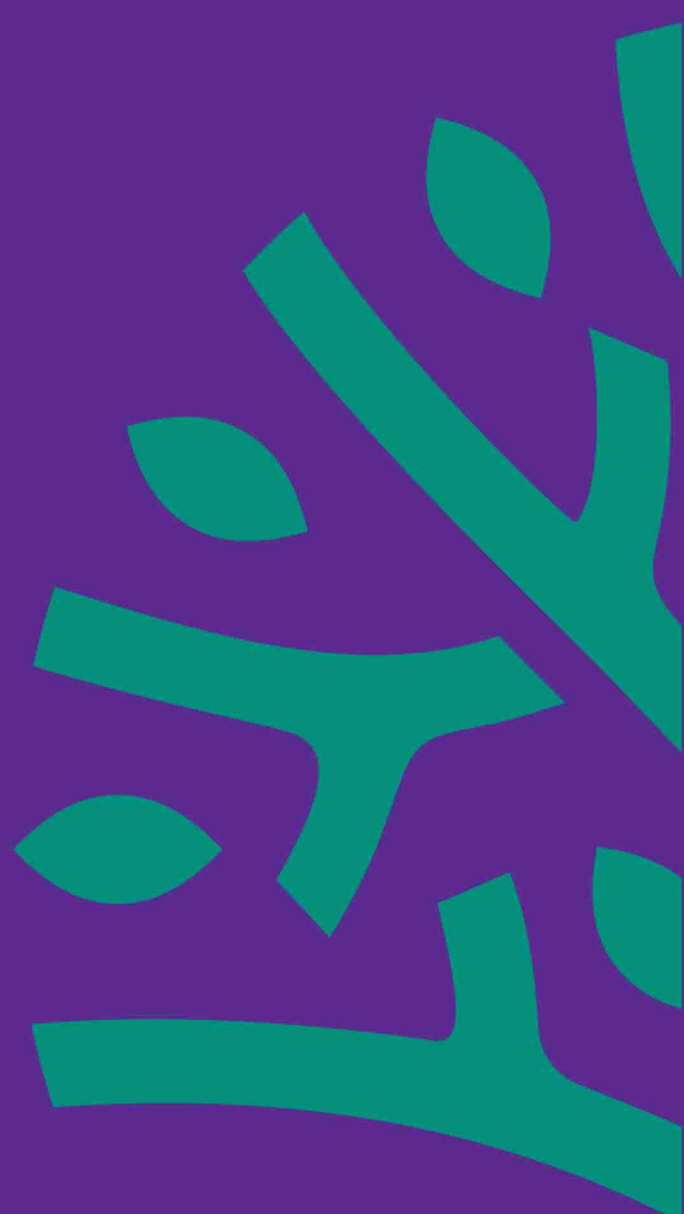
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