

EVALUATION REPORT OF THE UNIT

Cimi - Centre d'immunologie et de maladies infectieuses

UNDER THE SUPERVISION OF THE FOLLOWING ESTABLISHMENTS AND ORGANISMS:

Sorbonne Université

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

Centre national de la recherche scientifique -
CNRS

EVALUATION CAMPAIGN 2023-2024 GROUP D

Report published on March, 15 2024



In the name of the expert committee :

Michael Schindler, 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 Michael Schindler, University Hospital Tübingen, Germany

Experts:

Mr Frédéric Bringaud, CNRS, Bordeaux (representative of CSS Inserm)
Ms Sophie Candon, Université de Rouen Normandie (representative of CNU)
Ms Valérie Dardalhon, CNRS, Montpellier
Mr Jean-Christophe Deschemin, Inserm, Paris (supporting personnel)
Mr Julien Diana, Inserm, Paris
Ms Patricia Doublet-Dar, Université Claude Bernard Lyon 1 (representative of CoNRS)
Mr Friedrich Frischknecht, Heidelberg University, Germany
Mr Sebastian Kobold, Klinikum der Universität München, Germany
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HCÉRES REPRESENTATIVE

Mr Jacques Dutrieux

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Ms Jacqueline Capeau, Sorbonne Université
Ms Camille Chaudonneret, Délégation régionale Inserm Paris Centre
Ms Sylvie Guerder, CNRS INSB
Ms Patricia Renesto, Inserm IT Immunologie, Inflammation, Infectiologie et Microbiologie

CHARACTERISATION OF THE UNIT

- Name: Centre d'immunologie et de maladies infectieuses
- Acronym: Cimi
- Label and number: UMRS1135, EMR8255
- Composition of the executive team: Director: Christophe Combadière, Deputy directors: Ms Marie-Caroline Dieu-Nosjean, Mr Guy Gorochov and Mr Olivier Silvie

SCIENTIFIC PANELS OF THE UNIT

SVE Sciences du vivant et environnement
SVE4 Immunité, infection et immunothérapie

THEMES OF THE UNIT

The "Centre d'Immunologie et des Maladies Infectieuses" (Cimi) is a medical and life science institute conducting pluri-thematic research on host-pathogen interactions of infectious diseases, the relationship of humans and their microbiota, as well as adaptive and innate immune responses under pathophysiological conditions. The aim is to understand inflammatory processes in the context of infectious diseases, but also cancer, to better control the clinical consequences. Approximately 160 staff members, half of which are permanent, are organized in twelve teams to achieve the research goals. They have access to state-of-the-art in house equipment for instance a flow-cytometry, imaging, insectarium and single molecule arrays facilities. Furthermore, there is access to shared facilities with other units at the campus of the Sorbonne University including BSL2 and BSL3 laboratories and technical omics platforms. Cimi strives and is reputed for its activities to transfer knowledge in terms of bedside to bench and vice versa bench to bedside as being reflected through the involvement of MDs and hospital staffs in research.

HISTORIC AND GEOGRAPHICAL LOCATION OF THE UNIT

The Cimi was created in 2014 as the UMR1135 by Inserm and Sorbonne Université and as the ERL8255 by the CNRS and is therefore a relatively young research institute. It is located on the campus of the Faculty of Medicine of Sorbonne Université on the Pitié-Salpêtrière site in Paris. Therefore, there is a strong opportunity for exchanges between research teams and hospital services. This is essential to foster the core of Cimi conducted science in terms of bedside to bench basic and translational research.

The teams are located on two sites of the campus. Most teams and the administration are hosted in the Faculty of Medicine building. Two teams are located in the CERVI building in the Pitié-Salpêtrière hospital.

RESEARCH ENVIRONMENT OF THE UNIT

Pitié-Salpêtrière is a major public hospital in Paris and is a great asset as the location of Cimi on the university medical campus and the presence of medical staff leads to excellent exchange between research teams and hospital services, fostering bedside-to-bench research and vice versa. Among others, Cimi has established collaborations with hospital departments in Hematology, Infectious Diseases, Internal Medicine and Emergency care.

The Cimi also benefits from access to various technological platforms and the interaction with other research units at the campus such as the Institut Cerveau et Moelle Épinière (IHU, U1127), Institut de Cardiométabolisme et Nutrition (IHU ICAN, U1166), Institut de Myologie (U974), Immunologie-Immunopathologie-Immunothérapie (I3, U959), Nutrition and Obesities-Systemic Approaches Research Unit (Nutriomics U1169) and Neurophysiologie Respiratoire Expérimentale et Clinique (U1158). Importantly, two UMS provide core facilities for animal experimentation (UMS28), genomics, proteomics and flow cytometry (UMS37, PASS).

At Sorbonne University Cimi members are involved in teaching activities, Cimi PhD students are affiliated with two doctoral schools of Sorbonne Université: Physiologie, physiopathologie et thérapeutique (ED394) and Complexité du vivant (ED515). Teaching is also done as part of the Master BMC (Biologie Moléculaire et Cellulaire) at Sorbonne Université.

At the local, regional and national levels Cimi is part of larger networks. It participates in the labex ParaFrap ('French Parasitology Alliance for Health Care'), a large consortium gathering recognized French teams in the field of Parasitology (<https://labexparafrap.fr>). The Cimi is a partner of the Site de Recherche Intégrée sur le Cancer (SIRIC) Curamus (<https://curamus-cancer.fr/>), and of the Recherche Hospitalo-Universitaire en santé (RHU) Coviferon. Cimi members participate in several 'programmes hospitaliers' de recherche Clinique (PHRC) reflecting its translational and clinical research. The Cimi is also strongly linked with National Reference Centers,

such as the National Reference Center for Mycobacteria and resistance to anti Mycobacterial agents (<https://cnrmyrma.fr>), the Reference center for lupus and antiphospholipid syndrome, and the Center for complex osteoarticular infections.

UNIT WORKFORCE: in physical persons at 31/12/2022

Catégories de personnel	Effectifs
Professeurs et assimilés	16
Maitres de conférences et assimilés	15
Directeurs de recherche et assimilés	9
Chargés de recherche et assimilés	7
Personnels d'appui à la recherche	29
Sous-total personnels permanents en activité	76
Enseignants-chercheurs et chercheurs non permanents et assimilés	11
Personnels d'appui non permanents	7
Post-doctorants	7
Doctorants	32
Sous-total personnels non permanents en activité	57
Total personnels	133

DISTRIBUTION OF THE UNIT'S PERMANENTS BY EMPLOYER: in physical persons at 31/12/2022. Non-tutorship employers are grouped under the heading "others".

Nom de l'employeur	EC	C	PAR
Sorbonne Université	20	0	9
Inserm	0	12	11
CNRS	0	4	5
Autres	11	0	4
Total personnels	31	16	29

GLOBAL ASSESSMENT

The overall performance of the Cimi is excellent.

In the last mandate, Cimi has achieved an impressive scientific output in terms of quantity and quality of studies that were published in internationally reputed and peer-reviewed specialist and generalist journals with the majority of them signing Cimi members as main authors. The breadth of publications reflects the multi-thematic scientific perimeter of the unit with research ranging from basic science to translational and applied science including studies with patient cohorts and work of clinicians in the fields of microbiology, immunology and cancer. Cimi maintains a very high and excellent level of extramural funding in the range of 25 Million € that sustains the interdisciplinary research. It has very good network of collaborations at the national and international level.

Recommendations of the last evaluation were considered and approached. An impact has been made on improving and strengthening the unit's internal communication and interaction. Still, only about ten percent of total publications are co-authored by two or more Cimi teams. Scientific topics and themes of the respective teams were revised to implement more functional research. To maintain the attractiveness for incomings, Cimi has refurbished and prepared lab space to host new teams and considerably invested in equipment and withholds state-of-the-art as well as cutting edge technologies for their teams which is organized in Core facilities including CyTOF, OMICs, mass imaging and others. The management has done an excellent job in terms of overall governance including measurements of sustainability, gender and equality.

A certain risk is associated to the fact that there was only one team joining the Cimi in 2023 whereas several group leaders with high fundraising capability and excellent scientific output retired or left the Cimi. Furthermore, Cimi lacks international visibility and has only few staff members coming from abroad. A good start is the recent recruitment of 3 international PIs. This finally leads to a reduction of unit team composition from twelve in the last mandate to a current number of eight. Hence, a structured and strategic recruitment and internationalization policy is necessary to strengthen Cimi in general and the respective main focus areas microbiology and immunology in particular. Furthermore, even though Cimi members file a large amount of patents and have certain industrial collaborations, valorization of the latter could be improved in order to leverage the high potential of the Cimi as a national and international recognized research institute with basic and translational research in infectious diseases and immunology. It is to note that Cimi showed an excellent and remarkable responsiveness towards the Covid pandemic with major impact articles that were nationally and internationally recognized. This demonstrates their core expertise in infectious diseases and immunology.

DETAILED EVALUATION OF THE UNIT

A - CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The management implemented multiple measurements to address the recommendations from the previous report. They reinforced communication and interaction between the teams by establishing weekly unit seminars called Ciminaires and an internal social network. Furthermore, there is a PhD club and students are in PhD graduate programs and a yearly retreat. During Covid19 a task force was established to organize joint research efforts. To increase visibility and the attractiveness a communication manager was recruited. Unfortunately, this person left the Cimi and these tasks are now done by the lab manager. Still, only ~10% of publications are signed by joint Cimi teams, which could be further improved.

To allocate space for newcomers, lab space was reorganized to have shared facilities and platforms. Furthermore, the office space was newly refurbished.

Efforts have been made to enhance the proportion of functional hypothesis driven studies in order to reshape the scientific strategy. This especially includes projects with clinical samples and has resulted in the implementation of functional validation via Crispr-Cas9. On top, teams implement cutting-edge and state-of-the-art technologies (Cytof, mass imaging, multiple omics) in their research. These measurements might also lead to an overall increased qualitative scientific production and help to reduce the disparities between the publication output of teams. Furthermore, a new team will join in 2023 with focus on severe malaria and younger PIs with international background joined the Cimi reflecting the increased attractiveness of the unit.

B - EVALUATION AREAS

Considering the references defined in the unit's evaluation guidelines, the committee ensures that a distinction is made on the outstanding elements for strengths or weaknesses. Each point is documented by observable facts including the elements from the portfolio. The committee assesses if the unit's results are consistent with its activity profile.

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

Assessment on the scientific objectives of the unit

The scientific objectives of the unit are excellent, ambitious and have high potential for socio-economic valorization due to the generation of potential medical advances.

Assessment on the unit's resources

The unit has access to all the equipment to carry out its projects. Financial resources are excellent and sufficient to support the unit's project.

Assessment on the functioning of the unit

The functioning of the unit is excellent in terms of organization, staff interaction and human resource management.

1/ The unit has set itself relevant scientific objectives.

Strengths and possibilities linked to the context

The Cimi is a multi-thematic institute that focuses on public health priorities with twelve teams that cover fundamental and translational research in various topics from infectious diseases to cancer.

The main strength of the institute is the ability to conduct research program from basic research (host/pathogens interaction, innate immunity, ageing, microbiota, cancer) to the development of therapies (vaccine, antimicrobial agents, biomarkers, immunotherapies). This translational research is supported by strong connections with the Pitié-Salpêtrière hospital.

Weaknesses and risks linked to the context

By nature, the disadvantage of a multi-thematic institute is the potential lack of synergy between the various teams working on different research topics. This risk is underlined by the low number of joint publications produced during the past five years.

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

The Cimi is located on the campus of the Faculty of Medicine of Sorbonne Université on the Pitié-Salpêtrière site in Paris allowing the development of extremely original translational research projects with significant benefits in clinical terms.

In terms of personnel, the unit has been attractive with 161 people including 23 researchers (DR, CR, MCF), 40 clinicians (PUPH, MCUPH, PH), 36 engineers and technicians, 8 postdocs, 34 PhD students and 20 Master students organized in 12 teams.

The environment of the unit is excellent and suitable for the projects developed with the presence of other research units on the campus (Inserm U1127, U1166, U974, U959, U1169, U1158) and share state-of-the-art platforms with two UMS (UMS28 and UMS37).

The Cimi has been refurbished to offer sufficient space to welcome incoming teams.

Weaknesses and risks linked to the context

The institute needs to manage the recent departure of several research teams.

The size of the administrative resources is too small relative to the size of the unit.

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

The overall organization of the unit is excellent.

Health and safety measures and the prevention of psycho-social risks is managed by a local prevention committee made up of the director, a prevention officer, who coordinates a network of eleven prevention assistants distributed by team, and seven first aiders at work. The Cimi has been a pilot laboratory for the Inserm psychosocial risk (PSR) prevention commission in 2017.

The unit has appointed an Information Systems Security Correspondent (CSSI) for the local officer at Sorbonne Université. Data protection is ensured using the Inserm electronic lab book and a secured local Network Attached Storage.

The Cimi has appointed a referent for gender equality and non-discrimination, the institute is composed of 92 women and 69 men.

The Cimi has set up a committee (GreenLab) whose main mission is to find solutions to limit the impact of research activities on the environment. This is an excellent initiative that should be duplicated in other institutes.

Weaknesses and risks linked to the context

A very broad scientific perimeter with many research topics and axis that might lead to a dilution of the Cimi core research mission.

EVALUATION AREA 2: ATTRACTIVENESS

Assessment on the attractiveness of the unit

The Cimi has an attractive scientific reputation due to its excellence in its field of research. Its establishment in the hospital Pitié-Salpêtrière allows the teams to lead innovative projects from basic to clinical research. The Cimi hosted PhD students and post-doc. The Cimi is part of networks of excellence as labex, PHRC, National Reference Centers. Grants from Europe, national calls and foundations provide a very important part of their financial resources. Senior scientists are engaged in many national and international activities: editorial in journals, expertise for organizations.

- 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

1/ The Cimi unit inherit from a long and strong history of excellent research in the field of immunology and the researchers of the Cimi maintain this high quality of science. They participate to national and international seminars, symposia, conferences and congresses. They are part of the organization of national and international scientific meetings (EMBO workshop, European Society of Immunology, Keystone Symposia). They participate to European projects (11 European contracts as H2020 projects, Horizon Europe, ...) and obtain grants from these which are a large part of the financial resources of the Cimi. Scientists participate to editorial board of several journals (Frontiers, Plos One, Medicine). They are implicated in various committees as experts (COVARIS, Aviesan-ITMO, WHO, EUCAST AMST...). They are members of funding agencies as evaluators (ANR, ARNS, ERC, ARC foundation...). Prize and distinctions recognize members of the unit (Women in science, Ordre du Mérite, Jacques Monod Fondation...) and one emeritus professor is member of the Academy of Medicine. They also participate to the evaluation of research (CSS Inserm, CSR Sorbonne, CoNRS CNRS, COMESP...).

2/ The Cimi unit hosted 70 PhD students and 32 postdocs scientist the last five years. They have access to technical core facilities (as cytometry and imaging platform) and may present their works in internal seminars. A very important point, and proof of the scientific quality and attention paid to young scientists: two of them succeeded for a permanent position at Inserm in 2023 (Inserm CSS5). If some researchers and technical staff left the unit these last years, almost as much arrived in the Cimi. The research unit also takes care of technicians and engineers, and fifteen of them obtain a promotion in the last five years. Positive attention participates to the quality of the hosting policy of the unit as the health and safety committee, the Greenlab committee and referent for gender equality. Students, postdocs, engineers and technicians are represented at the laboratory council.

3/ The Cimi unit gets successfully funds from national and international calls but also from foundation and R&D contacts. Researchers of the unit obtain or participate to eleven European grants (IMI H2020, Horizon Europe...), 78 national contracts (ANR, PHRC, ARNS, INCA...), eight for different labex (Laboratory of excellence) and idex

(Initiative of excellence). Funds from foundations represent 5 147 k€ (74 contracts). Although not obtained by competitive calls, the 28 contracts with industry or fruits of scientist's expertise participate to the acknowledgement of the unit. Moreover, the unit gain funds for the acquisition of high levels technologies for their own platforms or external ones.

4/ Three platforms with high-level apparatus sustain the quality of the research. The cytometry platform with five analysis cytometers, in particular a spectral cytometer, and two cell sorting cytometers offer large possibilities to study molecular expression in cellular populations. The SIMOA platform with the ultrasensitive assays is an important advantage in the field of inflammatory studies and cohorts for characterization of biomolecules in physiological fluids. The imaging platform with its three microscopes in different level of safety laboratories allow to study living cells and fixed samples. Last, but not least, the fourth one is the insectary platform which provide Plasmodium parasite for rodent, and simian models. In addition, the previous ones, the unit have access to external core facilities including animal facility, proteomic facility and genetic facility.

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

The unit did not obtain any ERC grants. Interactions with the other research units for a more translational researches seem underdeveloped. There is huge lack of PhD students, postdocs and researchers as well as team leaders with international background, i.e. coming from abroad.

The Cimi is a very attractive place, however this is poorly perceived especially on the international level.

EVALUATION AREA 3: SCIENTIFIC PRODUCTION

Assessment on the scientific production of the unit

The unit's scientific output is excellent and enjoys national and international influence. The unit's different research themes are represented in a balanced manner.

The majority of articles are published in high-level generalist and specialized journals.

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

1/

During the reporting period, the unit published 941 articles (470 as principal investigator) including 690 original research papers (289 as principal investigator). 79 publications involved internal collaborations of two or more Cimi teams.

Several articles were published in highly reputed generalist or specialist journals (Science, Science Translational Medicine, Journal of Experimental Medicine, Journal of Clinical Investigation, Communications Biology, eLife, PLOS Pathogens...). These publications reflect the pluri-thematic nature of the institute and the high expertise of the Cimi teams.

The unit also published major studies on Covid reflecting the reactivity of the Cimi teams.

2/

The productivity of the institute is excellent with an excellent ratio of the number of publications to the number of staff members. The research axes within the unit generate a balanced production but with two teams with a higher production. All permanent researchers contribute to the scientific output of the unit.

PhD students, post-doctoral fellows and engineers are associated with the work of the unit and appear as first authors on the publications resulting from their projects.

3/

Data management and traceability, as well as quality control and work ethics within the unit appear to be adequate. Experiments are recorded in electronic lab notebooks and data stored in databases with a log and regular backups.

In terms of ethics, projects involving human samples are carried out following the national regulation and safety requirements and all projects are carried out in strict accordance with the approval of the Ministry after evaluation by the ethical committee Charles Darwin of Sorbonne université.

The Cimi has implemented the HAL repository with all the publications made between 2017-2022. An internal seminar was dedicated to Open Science policies and tools.

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

Some disparities in the scientific production are observed between Cimi teams.

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's research in society is excellent but unequal. Most of them have developed partnership with pharmaceutical companies and patients' associations. These interactions result in funds for the Cimi and backed PhD students with Cifre thesis.

Numerous scientists were interviewed by different media supports. Members of the unit share scientific knowledge in public meeting such as the Fête de la science. Workshops for school teachers and pedagogic kits have also been efficiently conducted. Members teach through scientific training for master students.

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

Cimi has excellent track record of collaboration with a range of industry partners across many different units and participates in different outreach programs. Most of the teams have developed collaboration with industrial partners (LumediX, AgroBio, LVMH recherche, Sanofi, BPI France, AstraZeneca, Janssen...) or patient's associations (Fondation Raoul Follereau, AFPCA, Maison de l'Artemisia...). These partnerships allow recruitment for two engineers, two postdoc scientists and seven PhD students with Cifre doctoral fellowships or grants for thesis. One start-up of biotechnologies (Minka Tx) was founded by two researchers of the unit.

The unit conducts major fundamental research in the fields of immune responses, host-pathogens interactions and inflammation with economic and societal actions. To transform scientific knowledge to benefit for patients, almost every team filed patents, declaration of invention, envelopes Soleau and licences. Sixteen patents were filed and concerned medical decision support and diagnosis, medical therapies, vaccine immune efficacy. Licences were established for the treatment of antibody deficient patients, for monoclonal antibodies and treatment for hematologic malignancy.

Most of the teams have participated to the "Fête de la Science" every year. Students of the unit developed an educational board game in immunology and a scientific escape game. Members share knowledge to public by various supports as YouTube, MOOC, and are interviewed by national media (Le Monde, Radio France, France Culture, EuroNews...).

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

Huge variability in the involvement of each team to share scientific knowledge in society.

ANALYSIS OF THE UNIT'S TRAJECTORY

As outlined in this report, Cimi managed to consolidate in various areas related to organizational aspects, governance, promoting internal interaction and research synergism and maintaining very high and excellent level of funding acquisition as well as scientific production.

This is a solid basis to achieve the self-formulated goal to establish Cimi as the leading institute for basic and translational research in the field of microbiology and immunology, with national and international visibility and connected to the society.

As in the last period, the Cimi is facing the challenge to make a transition in group composition and number to strategically reinforce and critically strengthen their core research. As it stands, Cimi lost several researchers that left or retired, some groups were merged or restructured due to their size and opposing to that there was no recruitment of junior group leaders or mid-career scientists at high levels that could close the gaps. In conjunction to that, the Cimi needs proactively work on its visibility and attractiveness which goes hand-in-hand with a stringent internationalization that should be reflected by its recruiting policy.

Some recent recruitments were successful, and the integration of the new malaria team seems to synergize very well with the planned axis of research. However, as it stands, Cimi plans to go into the next extended period with eight teams as compared to twelve in the previous period.

Notably, these teams are supposed not only to work in the core research of infectious diseases and immunology, but also cancer meeting societal challenges in immune-oncology, communicable diseases with an emphasis on pathogen-host interactions as well as vaccines and on top basic immunology including translational research. Given this multi-thematic wideness that is further spread by the different axis of research in the respective teams, in conjunction with the reduced number of teams, there might be a certain risk to dilute too much in terms of thematic focus. Therefore, there should be a clear strategy to recruit junior faculty with the objective to establish new teams within the scientific perimeter of the Cimi. In this context, the plan to take part in calls for junior teams (e.g. ATIP Avenir) is highly appreciated and should strictly be followed up. Furthermore, the plan to reallocate running budget of Cimi to generate package funding that facilitate the integration of new junior teams in the Cimi and the investment in innovative equipment is essential for further development.

Overall strategy in terms of staff management and governance seems excellent and will ensure continuation of the very high level of management.

To meet societal challenges, implementation of strategic plans was or will be done for instance in the 4R principles and plans for scientific integrity and establishment of representatives for diversity, equal opportunities, carbon footprint etc. All this is excellent. On the other hand, it is less clear how the institute as well as the society will benefit from the assets of the Institute, e.g. its strong translational focus. Here, establishment of a technology transfer strategy taking use of the existing support infrastructure provided by the supervising bodies would be desirable and likely promote better valorization of the excellent research results.

RECOMMENDATIONS TO THE UNIT

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

The committee recognizes that it will be critical for the unit to reinforce administrative staff. The committee considers the position of the lab manager for the unit crucial therefore recommends to secure that position by sustained support and adequate recognition.

For the fundamental part of research, it is important that there is a continuous support by the supporting bodies.

Maybe reinstate a half-time position for communication to outside and within.

Identify and focus on key research topics.

Recommendations regarding the Evaluation Area 2: Attractiveness

It is advised to follow on a continued and proactive international recruitment policy on all levels, especially PhD students, postdocs and group leaders.

Cimi should reinforce development of a "corporate identity", use social networks and other means to increase attractiveness and visibility nationally and internationally.

Increase international funding across more groups

Recommendations regarding Evaluation Area 3: Scientific Production

No specific recommendation.

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

There are also disparities in how teams communicate to the public and these activities should be strengthened throughout such as more teams participate in these activities and communicate their excellent and important research.

Furthermore, Cimi has a strong translational focus, many patents, but few are licensed or further valorized. It is suggested, to develop a technology transfer strategy to brief and motivate researchers on all levels to follow paths of valorization. Consequently, taking use of the existing support infrastructures for technology transfer by the supervising bodies is encouraged.

TEAM-BY-TEAM ASSESSMENT

Team 1: HIV Pathogenesis and Immune Ageing
 Name of the supervisors: Mr Victor Appay & Ms Delphine Sauce

THEMES OF THE TEAM

Mechanisms and consequences of Immune senescence and exhaustion during aging and viral infections
 Pathogenesis of HIV infection and determinants of CD8 T cell efficacy.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

A collaboration with an industrial partner has been established.

A new post-doc was attracted during the 2017-2022 period as well as one visiting fellow in the context of an industrial partnership.

Collaborations with other Cimi teams have been extended, in particular with team 12 (emerging internal team created in 2020).

WORKFORCE OF THE TEAM: in physical persons at 31/12/2022

Catégories de personnel	Effectifs
Professeurs et assimilés	2
Maitres de conférences et assimilés	1
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	1
Personnels d'appui à la recherche	3
Sous-total personnels permanents en activité	7
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	1
Post-doctorants	0
Doctorants	1
Sous-total personnels non permanents en activité	2
Total personnels	9

EVALUATION

Overall assessment of the team

Excellent team with a high level of visibility/recognition in their field (immune aging/ infectious diseases), and developing an excellent translational research program with a good synergy between the two research axis developed. The scientific output is very good and the team developed a very good link with the non-academic world. The team demonstrated an excellent fund raising capacity and is also highly invested in technological innovation. The team is also highly implicated in teaching and dissemination to the public.

Strengths and possibilities linked to the context

During the 2017-2021 period, the team significantly contributed to a better understanding of the parameters underlying the development of an effective CD8 response using both in vitro and in vivo experimental models for T cell priming, with promising future developments in vaccine design (AIDS 2019, JCI Insight 2019, EBiomedicine 2022).

The second theme focused on immune aging and the synergistic effect of viral infections and inflammation in the elderly with good to very good scientific output (JCI Insight 2018, EBiomedicine 2022, and journals specialized in geriatrics) as well as translation to medical tools (predictive models for stratification of outcomes in the context of infectious diseases or non-infectious events, two patents and one maturation program).

The scientific production is very good considering the size of the team with 80 publications between 2017 and 2022 including 31 original publications as main authors (Ebiomedicine 2017-2022, JCI Insight 2018-2019, Frontiers Immunol 2018x2, 2020). All staff members participate in the scientific production.

The team has a strong expertise in human immunology and maintains close links with hospital departments through several team members, enabling efficient development of the program (patient samples, clinical trials) Productive collaborations have been developed within and outside Cimi (at the national and international level).

The team is actively invested in technical innovation (responsibility of the cytometry plateau and the European Quanterix platform) and successful in getting funds for equipments.

The fundraising capacity is excellent both at the european (H2020- ANR EraNet) and national (ANRS, ANR, Sidaction) levels. The team has good interactions with the non-academic world: several partnerships were developed (LumediX, AgroBio, Transgene and LVMH) with research contracts established with some of them. A maturation program (SATT Lutech) is ongoing.

The team has an excellent national and international visibility, particularly in the field of immune aging: 3 national awards were obtained (from Fondation de France and Fondation de l'avenir); Inserm label "Transversal program on Aging; multiple international invitations of both team leaders and also other team members; participation in the organization of national and international conferences. Both PIs (and other team members) are reviewers for international journals and several grant application agencies, participation of evaluation committees (ARC, ANRS, Inserm, ANR...).

Several team members have a high implication in training /teaching.

The team is involved in communication to the public.

Weaknesses and risks linked to the context

The size of the team is relatively small with only two full-time permanent researchers including one the team leader who left the center in 2020, and two research support staff.

Analysis of the team's trajectory

The new team (2023-2027) will merge teams 1 and 12, and welcome a new PI (PUPH emergency department of Pitié hospital). It will thus include only one full-time researcher, six members with hospital and/or teaching duties and two permanent support staff.

The general aim of the new team is to characterize the biological pathways and cues linking environmental exposures (chronic or acute) to host immune responses, inflammation and subsequent clinical outcomes. The research project is structured around three axes. Two of them are based on the respective expertise and previous achievements of each co-leader ("Acute and chronic stressors of the immune system" and "Immunity/Microbiota").

The third axis, jointly led by the co-leaders who are long-standing collaborators, will develop a new theme focusing on metabolic pathways in immune cells during aging as well as microbial metabolism during dietary interventions in children or in obese subjects (a condition believed to induce immune senescence). Hypothesis-driven, it will explore the link between nutrition, microbial metabolism in the gut and host immune response, in particular vaccine responses.

The program relies heavily on cohorts to which the team has secured access through clinical studies conducted by its members and European consortia (VITAL IML, TransINF).

The technologic approaches, collaborations required for the implementation of this program are already available. Relevant industrial partnerships have been established and will be developed.

Overall, although mostly observational and correlative, the research project is pertinent and will make use of state-of-the-art technologies in clinical immunology. It has strong translational potential in terms of outcome prediction in aged patients as well as development of novel nutritional or therapeutic approaches to modify gut microbiota and host immunity. It will surely benefit from the complementarity and synergy in the expertise of the two co-leaders.

RECOMMENDATIONS TO THE TEAM

Merging teams 1 and 12 seems to be a good asset. However, the proposed translational program appears rather ambitious for a relatively small team, with only one full-time PI and a co-leader with heavy teaching duties. The committee recommends requesting a transitional teaching leave to facilitate the establishment of the future team.

Recruitment of more support staff, PhD students and post-docs is also recommended.

More insight into the mechanisms underlying immune aging and inappropriate responses to acute stresses could be achieved by using cutting-edge technologies (such as RNAseq, ATACseq,...) in addition to those already planned.

Team 2: Emergence and diffusion of multiple drug resistance against antibiotics

Name of the supervisor: Ms Alexandra Aubry

THEMES OF THE TEAM

Mechanisms of emergence and diffusion of multiple drug resistance (MDR) in bacteria by focusing on the chromosome-born multi-drug resistance (MDR) in *Mycobacterium tuberculosis* (*Mtb*) and the plasmid-born MDR in Enterobacterales.

New therapeutic strategies to combat and overcome drug resistance.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Team 2 has obtained National and European grants, as recommended. While the overall number of publications is impressive and increasing (223 in 2023 vs. 136 publications in 2018), the percentage of publications directed by team members has not increased (37% vs. 52%).

Team 2 has integrated a permanent researcher to strengthen the enterobacteria group, and has maintained its human resources despite the retirement of two members and the death of another, by recruiting three permanent staff (2 in progress), three post-docs, and several technical supports on short term contracts. The team organizes regular laboratory meetings and journal clubs.

Team 2 scientific strategy has not fully succeeded in integrating work on mycobacteria with that on enterobacteria, despite the hiring of a researcher dedicated to MDR in enterobacteria. Team 2 has developed an effective fund-raising strategy based on national (2 ANR) and European (IMI, JPAMR) calls, as recommended. Team 2 has begun an in-depth analysis of resistance mechanisms in *Mtb* using new technologies, namely genomic and MS approaches. Team 2 has developed a national prospective cohort of MDR-TB cases using an electronic registry in close collaboration with the National Tuberculosis Consilium (NRC-MyRMA). Team 2 also plans to integrate biological samples into an institutional biobank to centralize the storage, management and ethical evaluation of biological samples used in research, as recommended.

WORKFORCE OF THE TEAM: in physical persons at 31/12/2022

Catégories de personnel	Effectifs
Professeurs et assimilés	3
Maitres de conférences et assimilés	2
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	1
Personnels d'appui à la recherche	2
Sous-total personnels permanents en activité	8
Enseignants-chercheurs et chercheurs non permanents et assimilés	3
Personnels d'appui non permanents	2
Post-doctorants	2
Doctorants	4
Sous-total personnels non permanents en activité	11
Total personnels	19

EVALUATION

Overall assessment of the team

Excellent team with very high national and international visibility and excellent fund-raising capacity.

Strengths and possibilities linked to the context

High number of publications (223 articles + reviews), mainly in clinical microbiology.

Significant results in the field of epidemiology of drug resistance in mycobacteria in France (in conjunction with the Centre de Référence pour les Mycobactéries), e.g. European Respiratory Journal in 2021.

Long-established national and international expertise in experimental mycobacteriology, with a number of leading researchers in this field (international mobility, invited conferences, expertises...).

Access to biological material and relevant data from the national reference laboratory for mycobacteria, and significant translational activities: hospital, CNR-MyRMA, pharmaceutical and biotech companies.

Improved attractiveness and recruitment of three post-docs, a full-time researcher and contract technical staff.

Improved team organization with more effective internal communication thanks to regular laboratory meetings.

Strong ability to raise funds from national/international calls for proposals and industrial contracts.

Implementation and development of new technologies, namely proteomic and genomic tools for the identification of bacteria and resistance.

Weaknesses and risks linked to the context

Publication mainly in clinical research journal, few functional studies published.

Isolation of the "enterobacteria" group, following the departure of the previous leaders and despite the recent arrival of a full-time researcher.

Imbalance in human resources between the four thematic groups, with the absence of full-time researchers in most groups and PhD students in some.

Need for a bioinformatician to manage the big data generated by -Omics data.

Moderate organization and low valorisation of biological samples.

Analysis of the team's trajectory

Team 2's project, in terms of organization and scientific strategy, should address most of the weaknesses identified:

Despite the same organization into four groups, the team will be co-directed by A. Aubry and now R. Tournebize, which should improve the integration of the enterobacteria theme into the team's overall scientific strategy.

More functional studies will be carried out, both (1) on mycobacteria, capitalizing on the structural knowledge obtained on fluoroquinolone-targeted DNA gyrase in mycobacteria, and (2) on enterobacteria, with a new research project that aims at using bacteriophages and phage capsule depolymerases to target MDR K. pneumoniae. It will also be important to develop phage therapy approaches targeting mycobacteria in the medium term, as has been proposed. Noteworthy these projects are already funded.

One team member has acquired essential expertise in artificial intelligence applied to mass spectrometry, which will enhance the performance of projects based on new technologies.

Team 2 has developed a national prospective cohort of multidrug-resistant tuberculosis cases using an electronic registry in close collaboration with the National Tuberculosis Consilium (NRC-MyRMA), and also plans to integrate biological samples into an institutional biobank to centralize the storage, management and ethical assessment of biological samples used in research.

It should be noted that axis 4 on neglected infectious diseases is socially useful but rather difficult to valorize.

RECOMMENDATIONS TO THE TEAM

The committee encourages Team 2 in the development of its new strategy, which integrates more functional studies and new technologies that should increase the impact of its research. It also takes note of the project to enhance the value of clinical samples by structuring a biobank.

One point of vigilance will be to really integrate the enterobacteria axis into the team's overall strategy, which to date has focused mainly on mycobacteria. Particular attention will also need to be paid to current recruitments, to help rebalance the strengths of the four axes. It remains important to recruit one or two full-time researchers, and to develop high-level international collaborations to capitalize on the team's particular expertise in mycobacteria.

Team 3: Chemokines, phagocytes and inflammation
 Name of the supervisor: Mr Alexandre Boissonnas

THEMES OF THE TEAM

Functions and dynamics of the myeloid compartment during inflammatory and infectious diseases.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

No collaboration with team 8 was initiated.

One permanent IE joined the team in 2022 after the departure of team 4's leader.

WORKFORCE OF THE TEAM: in physical persons at 31/12/2022

Catégories de personnel	Effectifs
Professeurs et assimilés	0
Maitres de conférences et assimilés	1
Directeurs de recherche et assimilés	2
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	2
Sous-total personnels permanents en activité	5
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	2
Post-doctorants	0
Doctorants	4
Sous-total personnels non permanents en activité	6
Total personnels	11

EVALUATION

Overall assessment of the team

Small-sized team with an excellent scientific output, a high level of expertise in live imaging technologies and a growing visibility in a competitive field.

Excellent integration of both basic and clinical studies in research activities

Strengths and possibilities linked to the context

During the 2017-2022 period, the team shifted its original interest in the role of chemokines to the functions and dynamics of the myeloid cell compartment in diseases, in accordance with the interest and expertise of the new PI who took over as team leader in 2019. The team has developed its program both at the fundamental and translational (myeloid biomarker identification and therapeutic development) levels, relying on its technical expertise in state-of-the-art single cell analysis (spectral and mass cytometry, multi-photon live imaging, scRNAseq).

The scientific production of the team is very good with a number of publications in high quality journals proportional to the size of the team, including 38 publications as PI ; significant contributions have been made to the understanding of the dynamics of macrophages in tumors or during tissue regeneration (JEM 2018, JEM

2020, Cell reports 2022) ; the complexity of neutrophil responses during sepsis have been uncovered (Am J Respir Crit Care Med 2022) ; a new theme on the interactions between innate immunity and *Aspergillus fumigatus* (Haematologica 2020) have been developed ; the team has also engaged in productive collaborations within the Cimi (Nature comm 2018, JCI Insight 2021).

The team has a long-standing reputation in the field of chemokines and chemokine receptors and an excellent national visibility of the team on the mononuclear phagocyte system.

The team has developed a strong expertise in single cell multiomic studies and two photon microscopy; it is involved in technical platforms: the leader in charge of the Cimi flow cytometry equipment and member of the scientific committee of the flow cytometry platform of the campus (CyPS).

There is a good translation of research activities into the development of medical tools with two patent applications (diagnostic tools for sepsis; prognosis and stratification tools for Covid19) as co-inventor.

Student training is excellent: nine PhD students were trained between 2017 and 2022, with four thesis defences in 2017-2018, and five ongoing thesis including two in co-direction. This is highly commendable given the small number of permanent staff; the involvement of the PhDs in the scientific production of the team is good (at least one publication as first author, regular co-authorship in second position).

The team has a very good funds raising capacity securing more than 1.6 M€ between 2017 and 2022 at the national level (ANR, ANR, INCA, ARC, Ligue Nationale contre le cancer).

Ongoing efforts have been made to develop partnerships with pharmaceutical companies (SANOFI iAward project Cifre thesis).

Weaknesses and risks linked to the context

The implication of the team in international programs as well as its international visibility (funding and conference invitations) are limited.

Analysis of the team's trajectory

The team will not be reconducted and will join another research center.

The PI responsible for the program on host/pathogens interactions during invasive aspergillosis will join the Silvie team (team 8 - NC6) in 2025 to strengthen the axis on fungal infections.

The technical expertise developed in live imaging by the team leader may be lost to the center.

RECOMMENDATIONS TO THE TEAM

No recommendation due to the discontinuation of the team.

Team 4: Skin, Immunity and Vaccination

Name of the supervisor: Ms Béhazine Combadière

THEMES OF THE TEAM

The scientific theme of the team is vaccinology with a particular focus on skin vaccine strategies from fundamental to translational research. One major objective is the analysis of individual and vaccine-related factors impacting vaccine responsiveness.

Over the 2017-2022 period, the team conducted its research program according two main axes:

- a translational axis aiming at characterizing molecular and cellular immune networks triggered after vaccination, relying on clinical studies;
- a second axis aiming at identifying early innate signatures predicting the efficacy of vaccine-induced responses, with a particular focus on mechanisms underlying immune skin responses.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The team has put efforts in gaining insight into the mechanisms underlying immune skin responses, for example unravelling the role of IL-32 in activating Langerhans cells and inducing their migration from epidermis to dermis. Collaborations within Cimi have been reinforced, leading to several collaborative publications (teams 3, 6 and 9).

WORKFORCE OF THE TEAM: in physical persons at 31/12/2022

Catégories de personnel	Effectifs
Professeurs et assimilés	0
Maitres de conférences et assimilés	0
Directeurs de recherche et assimilés	1
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	1
Sous-total personnels permanents en activité	2
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	0
Post-doctorants	0
Doctorants	0
Sous-total personnels non permanents en activité	0
Total personnels	2

EVALUATION

Overall assessment of the team

This is an established and internationally well recognized team in the field of vaccinology and skin immunization with very good scientific output and excellent translation of research into potential medical tools, as well as excellent funds raising capability.

Strengths and possibilities linked to the context

Scientific output of the team is very good with 80 publications including 22 as PI and among them, twelve scientific publications in high quality specialized journals.

Main achievements of the team in skin immunology were: unravelling of the role of IL-32 in activating Langerhans cells and inducing their migration from epidermis to dermis (Br J Dermatol 2018); description of the critical role of skin-derived migratory dendritic cells in the generation of TFH cells and germinal centers following skin immunization (J Invest Dermatol 2017); development of a strategy for identification of innate molecules differentially expressed in dermal and epidermal layers very early after skin vaccination and potentially associated with optimal immunization (J Proteomics 2020).

The team is actively implicated in clinical studies, which notably, has allowed for the identification of an early innate signature associated with either specific cytotoxic CD8+ T cell or antibody responses after flu vaccination (JCI 2019) as well as a comparison of early innate events induced by transcutaneous or intramuscular vaccination (Frontiers Immunol 2020).

2 patent applications were filed in 2020 (predictive markers of vaccine immune efficacy /immunological markers of severe forms of Covid).

Several collaborative publications with other Cimi teams were established, in particular in the context of the Covid pandemic (JCI Insight 2021).

The team has a good implication in international programs: the team leader was leader of a work package in a H2020 project (European AIDS Vaccine Initiative 2020 consortium) for the development of candidate HIV vaccines.

There is a very good national/international visibility of the team leader (renewed FRM label in 2020, co-director of the International Vaccinology courses at Pasteur Institute since 2017, co-chair of the global influenza and RSV initiative in 2019, expert on the Covid international advisory board in 2022...) who received two awards (women in science and Innovation - 2020, chevalier de l'ordre du mérite in 2022), invited to give a talk to more than 20 international conferences.

The team has an excellent fundraising capacity considering its size; successful applications to national and international competitive calls (H2020, ANRS, APHP, FRM label) have secured more than 2 000 k€ between 2017 and 2023.

The team has established very good links with the non-academic world through fruitful partnerships (BPI France, Osivax, Mymetics).

The training activity over the 2017-2022 period was good with three PhD students (last thesis defence in October 2021) and 2 non international postdocs.

There is a particularly strong involvement of the team leader in the communication to the public on the topic of vaccines (Inserm press, Huffington post, EURONEWS, Le Monde, podcast Radio France international...).

Weaknesses and risks linked to the context

There is a heterogeneous level of publications among PhD students: one student had seven publications (including 2 in first author and 1 in second) whereas the other two had only 1 publication as second author.

Analysis of the team's trajectory

Three members left the team and the unit (1 PUPH, 1 MCUPH and 1 PH) between 2019 and 2020.

The team leader left Cimi in 2022 to join the private sector and the team was ended.

The remaining support staff (IE) was integrated in team 3 in 2022.

RECOMMENDATIONS TO THE TEAM

No recommendation due to the discontinuation of the team.

Team 5: Immune microenvironment and immunotherapy

Name of the supervisor: Ms Marie-Caroline Dieu-Nosjean

THEMES OF THE TEAM

The team focuses on studying the tumoral microenvironment of solid tumors and in particular, specific structures-tumor-associated Tertiary Lymphoid Structures (TLS)– Combining complementary expertise in immunotherapies, antibody design, their objective is to decipher TLS immune functions/neogenesis in link with the tumor environment and develop original immunotherapeutic strategies targeting these structures to improve anti-tumor responses and overcome treatment resistance.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

During the reporting period, the team had made an important effort to develop mechanistic studies and several strategies had been initiated in parallel to address mechanisms leading to TLS generation/maintenance and thus, to increase the chances to identify the pathways involved. The recruitment of young scientists remains a weak point of the team between 2017-2022.

WORKFORCE OF THE TEAM: in physical persons at 31/12/2022

Catégories de personnel	Effectifs
Professeurs et assimilés	2
Maitres de conférences et assimilés	2
Directeurs de recherche et assimilés	1
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	2
Sous-total personnels permanents en activité	7
Enseignants-chercheurs et chercheurs non permanents et assimilés	4
Personnels d'appui non permanents	0
Post-doctorants	0
Doctorants	3
Sous-total personnels non permanents en activité	7
Total personnels	14

EVALUATION

Overall assessment of the team

This is a team with a high level of expertise and visibility in their field. Their implication in developing immunotherapies/translational activity and interaction with the non-academic/industrial world are excellent. Promising results are upcoming and the scientific output is very good. The team has an excellent level of implication in teaching, dissemination to the general public and the high implication of the team leader in the scientific management of the research is to be noted.

Strengths and possibilities linked to the context

The scientific output of the team is very good with 70 articles including original articles/reviews/book chapters as main authors (and 151 total) - (Sci. report, Front Immunol, Commun Biol., Oncoimmunol, Cancer cell.). A blood TLS signature was identified in NSCLC patients which could represent a biomarker and a patent was co-filled with AstraZeneca 2021. The team clearly put an important effort to dissect the mechanisms associated with

TLS neogenesis /maintenance and developed multiple strategies with this purpose. Part of these studies are not yet published (manuscript in preparation/revision points to a neuro-immune crosstalk involving sympathetic fibers). The other approaches focus on further analyses of ILC3-like sub-populations identified by RNAseq correlating with TLS neogenesis and evolving during inflammation (collaborations set up for the development of this project) as well as three potential TLS inducers identified and currently being tested using engineered oncolytic viruses. Finally, the team has initiated internal collaborations: notably with Team 3 and Sanofi concretized by the co-direction a PhD student (Cifre fellowship).

The team has an international recognition in TLS and antibody-based immunotherapies fields underlined by the high national/international visibility of the team (over 20 invitations for oral presentation, invitations to edit books, meeting/workshop organisation, reviewers for high-profile journals (Cancer Res, Nature Rev Immunol., J. Clin. Oncol., Blood...) and several grant application agencies, member of scientific committees (CSS2 Inserm, president of CNI ARC commission, and member of the scientific ARC committee).

The interaction with the non-academic/industrial world is excellent and includes a long lasting/fruitful collaboration with Medimmune/astrazeneca (1 patent application co-filled in 2021), several publications, recruitment of a postdoc and an engineer) but also collaborations developed with Sanofi (CIFRE thesis fellowships), Transgene (Cifre thesis fellowship) and partnership with Janssen.

The team had been very successful in raising funds around 1.3 M€ since its arrival at Cimi in 2019 including: public grants (INCa, Cancéropoles, labex, Siric), industrial (Medimmune, Sanofi, Janssen), foundations (ARC, Ligue, BMS) but also in getting funded to acquire large/expensive equipments (around 400 K€).

The team is highly implicated in teaching (several master/school programs, including international-oriented programs) and has a very good training capacity of students/young researchers- eight PhD (4 have already defended). Importantly, team members are involved in the scientific output and there is a high implication in general dissemination (several team members were interviewed by different media supports).

Weaknesses and risks linked to the context

Several projects ongoing which may be oversized considering the structure-composition of the team. Furthermore, the future axis on Tregs is important but could generate a potential concern in such internationally highly competitive environment.

The recruitment of young scientists remains a weak point of the team between 2017-2022, and there is a need for more postdocs.

No major European /international grant.

Analysis of the team's trajectory

Between 2017-2022, despite its implication in developing immunotherapies, antibody engineering, etc., the team has notably put an important effort to investigate the mechanisms involved in TLS neogenesis/maintenance and developed several strategies with this purpose. Interesting results were generated from these studies and it should bring important information regarding TLS biology in the coming mandate. In June 2023, 1 researcher integrated into the team (previously in team 7). The overall research plan of the team for the upcoming period focus on Tregs, TLS as well as its implications and potential for therapeutic exploitation is credible and in line with the team's core expertise.

RECOMMENDATIONS TO THE TEAM

Based on the composition of the team (3 full time researchers since June 2023: 1 DR2, 1 DR emeritus, 1 CRHC) and in light of the promising targets/results identified during 2017-2022 about the mechanisms associated with TLS generation and research program proposed, the team should focus their efforts to recruit young researchers/postdocs and/or define priorities to bring these projects to fruition under optimal condition. The team should consider the recruitment of international staff and fellows in an effort to increase diversity.

One challenge during the upcoming period, will be the integration of the new axe focusing on Tregs with the other projects developed in the team and considering the high competitiveness level on Tregs/cancer, to identify an original angle to follow on.

Team 6: Study and manipulation of tolerance in human immunopathology
 Name of the supervisor: Mr Guy Gorochov

THEMES OF THE TEAM

The research of this team focuses on three axes: 1/ host-microbiota interactions; 2/ control of type I interferon responses and 3/ optimization of Treg cell expansion and stability.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The team improved the scientific publication record.

No tenured researcher joined the team. Bioinformatics skills have not been reinforced.

WORKFORCE OF THE TEAM: in physical persons at 31/12/2022

Catégories de personnel	Effectifs
Professeurs et assimilés	5
Maitres de conférences et assimilés	4
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	3
Sous-total personnels permanents en activité	12
Enseignants-chercheurs et chercheurs non permanents et assimilés	2
Personnels d'appui non permanents	1
Post-doctorants	2
Doctorants	5
Sous-total personnels non permanents en activité	10
Total personnels	22

EVALUATION

Overall assessment of the team

Excellent to outstanding team conducting a highly relevant research program and with high level of international visibility.

Strengths and possibilities linked to the context

The team is internationally recognized, notably for its expertise on IgA. A 2018 highlight paper in *Sci Trans Med* showed the severe gut microbiota dysbiosis in patients with IgA deficiency. Another excellent work (*Sci Trans med* 2021) revealed the potency of IgA in the early stage of Covid-19 disease. As the result of collaboration with Imagine Institute (Paris), the team investigated mucosal immunity in Covid-19 patients and participated in publication of two excellent papers in *Science*.

Overall, the team produced a very good number of publications. In the 2017-2022 period, the team published nearly 200 scientific articles of which around 1/3 were coordinated by the team (first and/or corresponding author) some in prestigious journals (*Science*, *Science Translational Medicine*, *J allergy Clin Immunol*, *J Exp Med*...). The international and national visibility of the team is very good. The members are regularly invited in

national and international conferences (European Society for Immunodeficiencies, European congress of rheumatology, International congress of autoimmunity...).

The team has been successful to obtain fundings (more than 6 M€) with ANR (5 as coordinator and 2 as partner), APHP clinical programs (4 as coordinator) and DIM IdF (3 as coordinator), associations and industrials. The group of Guy Gorochov has been labelled "FRM team 2022".

During 2017-2022, the team is strongly involved in training. Seven PhDs, seventeen Master students and four MD thesis have been hosted. Moreover, scientists are implicated in teaching many courses. They are heavily involved in expertise and evaluation activities and thesis/HDR juries.

Weaknesses and risks linked to the context

Scientific production in Axis 3 was quantitatively and qualitatively lower than in the two other themes (Axis 1 and 2), leading to an unbalanced publication rate among the groups.

One of the two doctoral students who completed their training did not publish a 1st author article (excepted 2 reviews).

Analysis of the team's trajectory

In line with its past activities, the team will be structured around two groups led by two PIs.

The first group, specialist on B cells and antibodies, will focus on IgA deficiency with large cohort of patients and animal model, and will decipher the cross-reactivity between gut microorganism and brain antigens. Anti-type I IFN antibodies will be also investigated to understand mechanism of tolerance breakdown.

The second group will focus on Treg cell-based manipulations and will pursue their strong implication on clinical trials, already funded by several substantial grants.

No collaboration observed between the two groups.

RECOMMENDATIONS TO THE TEAM

The committee encourages developing a transversal project between the two groups in order to increase the coherence and cohesion of the team.

Team 7: Immunoregulation and therapy in autoimmunity and cancer
 Name of the supervisor: Mr Benoît Salomon

THEMES OF THE TEAM

The team is organized around three groups overall focusing on distinct mechanisms regulating T cell responses in several inflammatory contexts (Cancer, autoimmune diseases):

- i) Regulatory T cells biology and more specifically, the role of TNFR2 and cellular metabolism in different contexts,
- ii) Development of cancer immunotherapies using monoclonal antibodies and targeting effector or regulatory T cells. Approaches developed include humanized murine models and advanced bioinformatics analysis,
- iii) Expression profile and function of IL27 and IL35 in regulating human T cell responses.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The recruitment/implication of five postdocs during the 2017-2022 period, and the team's projects have been organized/focused around the three main axis detailed above.

WORKFORCE OF THE TEAM: in physical persons at 31/12/2022

Catégories de personnel	Effectifs
Professeurs et assimilés	0
Maitres de conférences et assimilés	1
Directeurs de recherche et assimilés	1
Chargés de recherche et assimilés	2
Personnels d'appui à la recherche	0
Sous-total personnels permanents en activité	4
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	0
Post-doctorants	1
Doctorants	4
Sous-total personnels non permanents en activité	5
Total personnels	9

EVALUATION

Overall assessment of the team

This is a team with a recognized expertise/international visibility in the Treg field with fundamental as well as translational research activity. The team has a very good scientific production as compared to the team size and notably developed expertise in murine humanized models, mass cytometry-based single-cell approaches and advanced bioinformatics analysis. The team has a very good-excellent funds raising capacity and developed an excellent interaction with the non-academic world with one patent filled + three patents filled earlier and extended internationally (one already licensed).

Strengths and possibilities linked to the context

Overall, the team is recognized in the Tregs fields and has a very good national/International visibility: twelve invitations for oral presentations, the three group leaders are reviewers of several journals (science, PNAS, Nat. Immunol, Cancer research, JCI, ...) including high-profile journals, and one is a member of scientific committees (regional and national scientific committee Ligue contre le cancer).

The fund raising capacity is very good-excellent during 2017-2022 (from public national and European agencies -including ANRx2 as PI, FRM team, Marie-Curie ITN, INCa, foundations and private sources)- altogether around 1 700 k€.

The scientific production is very good as regards to the size of the team - with 29 articles published – fifteen as main authors (11 originals and four reviews- PNAS 2021, JI2020, Front Immuno 2019 and 2017, Eur. J.Immunol 2020 x2, Oncoimmunology 2019, Front. Oncol 2019, etc.) and three pre-print manuscripts. Of note, a collaborative study with another Cimi team (team 3) was associated with a published manuscript (Cancer immunol. Res. 2019). Furthermore, the team developed excellent links with the non-academic world: one declaration of invention was filled and three patents filled before 2017 were extended to the international domain during the reporting period (with one patent already licenced to GlaxoSmithKline), a software was developed, and the team's expertise on humanized mice lead to an industrial partnership with EGLE THX (postdoc salary support).

Between 2017-2022, the team trained an important number of students compared to the team size: 10 PhD students (six have already defended, two from a European consortium-ITN).

Weaknesses and risks linked to the context

Even if there is a clear complementarity of topics/expertise, the level of interaction between the three lines of research developed with the team seems low.

Of note, and this is most likely in link with the actual situation of the team (not reconducted for the next mandate, the PI already moved to Toulouse-before the end of the reporting period), the team do not have support staff holding a permanent position since 2021.

The level of publications as first author of PhD students seems heterogeneous and limited efforts were developed to disseminate to the general public.

Analysis of the team's trajectory

The team was created in 2014, renewed in 2019 and will not be reconducted after January 2024. In 2017, a 3rd researcher joined the team to develop her own line of research also explaining why this part was not as developed as the two other ones. Thus, between 2017-2022, the ITAC team was organised around three groups leaded respectively by the PI of team 7 who moved to Infinity, Toulouse. A researcher joined Team 5 in June 2023 and another one left to the CRI, Paris. The three group leaders had complementary expertise and approaches to study distinct mechanisms regulating T cells responses in several inflammatory contexts (Cancer, autoimmune diseases).

RECOMMENDATIONS TO THE TEAM

N/A since the team will not be reconducted.

Team 8: Biology and immunology of malaria

Name of the supervisor: Mr Olivier Silvie

THEMES OF THE TEAM

The team is investigating the difficult to research and hence still comparatively enigmatic plasmodium infected liver stages with two teams working on the malaria parasite, one on the immune response against liver stages and one on host cell factors. The team runs an insectary and works on both human and rodent infecting malaria parasites.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The team did a very good effort to incorporate the recommendations of the previous report such as strengthening the socio-economic impact. It now is involved in a large European network to work on the most promising malaria vaccine and a patent together with collaborators at the Pasteur Institute on a genetically modified parasite as an attenuated vaccine. It has now three researchers with an HDR and one additional researcher who will soon defend her HDR. The Cimi implemented a retreat where the team participates but a team retreat would still be beneficial, especially as a new group leader is joining the team.

WORKFORCE OF THE TEAM: in physical persons at 31/12/2022

Catégories de personnel	Effectifs
Professeurs et assimilés	0
Maitres de conférences et assimilés	2
Directeurs de recherche et assimilés	2
Chargés de recherche et assimilés	1
Personnels d'appui à la recherche	4
Sous-total personnels permanents en activité	9
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	1
Post-doctorants	1
Doctorants	3
Sous-total personnels non permanents en activité	5
Total personnels	14

EVALUATION

Overall assessment of the team

This is a world leading team on sporozoite biology that has continued to do excellent work in the field, being at the forefront of finding proteins important for liver cell entry, development and application of conditional mutagenesis, important insights into salivary gland invasion. Most PhD students and postdocs published first author papers. Excellent track record in funding acquisition. Still big potential for future discoveries.

Strengths and possibilities linked to the context

The team is uniquely well positioned to investigate Plasmodium liver stages and has contributed key studies to the understanding of Plasmodium sporozoite invasion of the salivary gland (PLoS Pathog 2022 & 2023) and the liver (Elife 2017, iScience 2023), added and used new conditional expression tools (PLoS One 2020), new proteomics data and made key contributions to understanding immunity against Plasmodium (two co-

authorships in EMBO Mol Med). They also tested successfully new medications and collaborated across a wide range of topics. This is only possible through external grant funding, which the group applied for highly successfully. Importantly, the large insectary run by the group can produce and handle human, rodent and primate infecting sporozoites, which opens the door for unique studies and collaborations as evidence in their publication record.

During the period under review, the team demonstrated an excellent fundraising capacity with seventeen contracts (9 as coordinators), including nine ANR, one H2020, two FRM and one Cifre, for a total amount of 3.2 M€. The team has raised 1.7 M€ with the contracts they coordinate.

The group is well recognised internationally and has built an integrative team recruiting new engineers and welcoming international students and postdocs, some of whom have published multiple first author papers.

Weaknesses and risks linked to the context

The potential of the team is large and the past five years have proven that the team can deliver excellent science. A challenge for the future is to integrate the work by new group leaders into the overall goal of the team. Ideally, all group leader focus on malaria parasite biology while also developing mycology as a second theme.

The team reports a perceived weakness in valorisation, which, considering their recent work and integration in the European vivax consortium will like be overcome in the next five years.

The person running the insectary will retire soon necessitating imminent recruitment of a successor to keep this vital resource functional.

Imbalanced contributions by group leaders on funding acquisition and student supervision.

Analysis of the team's trajectory

The team has done an excellent job in performing research, acquisition of funding, participation within the community (EU vaccine grant, ParaFrap, EMBO courses) and in publishing excellent papers. It has hence in large parts held up the promise. The team has opened up new research avenues and has the potential for key discoveries. The team, which has been enriched by the expertise of Allon Wiener's team, will build on its excellent track record to pursue current projects. The tetraspannin project will be refocused on Plasmodium, while maintaining activity on mammalian cells. The teams' two main objectives, namely (1) to maintain and strengthen their leadership in basic research on the biology of Plasmodium pre-erythrocytic stages, extending it to other areas of investigation such as Candida invasion and membrane dynamics and (2) to exploit fundamental discoveries in translational projects to develop novel intervention strategies against malaria, are in line with the team's determination to focus its activity on Plasmodium projects. In this respect, the team will greatly benefit from the arrival of B. Gamain and his team at the Cimi, to strengthen malaria research and increase Cimi's visibility in the field. Another opportunity will be the upgrading of the insectarium to include a BSL3 area for *P. falciparum* mosquito infections, putting the Cimi in a unique position to become a leader in the study of *P. falciparum* transmission stages. Similarly, upgrading the Cimi's imaging platform by purchasing a spinning-disk confocal microscope will benefit work on Plasmodium and candida.

The key challenge for the next period will be to keep the trajectory and not rely mostly on the lead by the Silvie team, since the latter is likely to be very busy with his new activity as Unit Director.

RECOMMENDATIONS TO THE TEAM

Do implement an annual team retreat, if just for one day, and ideally regular PI lunch/tea meetings.

The committee appreciates that decision that the tetraspannin work will focus mainly on the role of these proteins as receptors for Plasmodium ligands. While most of the group leaders will focus on Plasmodium biology, Allon Weiner will continue to develop a new strength in mycology research.

Make sure all group leaders have an HDR to increase number of PhD students the team can supervise during the next five years.

Keep up the world leading malaria liver stage work.

Team 9: NK and T cell immunity, infection and cancer
 Name of the supervisor: Mr Vincent Vieillard

THEMES OF THE TEAM

The team combines complementary and extensive expertise on anti-viral T cell responses and NK cell responses in various stress situations, and develop basic to translational research in several human pathological contexts. The research program is organized around three major axes:

- Development of vaccine strategies against AIDS and immunotherapies for HIV patients.
- Deciphering T and NK cell responses in emerging infectious diseases.
- Characterizing EBV-specific T and NK cell responses in transplanted recipients to develop alloreactive NK-based strategies in haematological disorders.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Some recommendations have been well applied such as implementing cutting edge technologies: the team has acquired and is in charge of the HYPERION-platform of the center, which is an asset. Furthermore, there is a credible effort to create complementarity focus on NK cells as common overarching topic of the team.

Some previous concerns, such as the high seniority of the team, problems associated with bandwidth of topics and thereby focus remain partly unaddressed.

WORKFORCE OF THE TEAM: in physical persons at 31/12/2022

Catégories de personnel	Effectifs
Professeurs et assimilés	4
Maitres de conférences et assimilés	1
Directeurs de recherche et assimilés	1
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	3
Sous-total personnels permanents en activité	9
Enseignants-chercheurs et chercheurs non permanents et assimilés	1
Personnels d'appui non permanents	0
Post-doctorants	0
Doctorants	4
Sous-total personnels non permanents en activité	5
Total personnels	14

EVALUATION

Overall assessment of the team

This is an established team demonstrating excellent translational efforts notably showcased by the initiation of a spin-off company using technology/research developed by the team. Very good-excellent national visibility of some key researchers of the team. Very good funding situation and the productivity is very good. The team has a high implication in training and very good outreach efforts to scientific and non-scientific audiences.

Strengths and possibilities linked to the context

There is a strong clinical link of the group with numerous translational immune monitoring efforts (privilege access to clinical samples including rare cohorts, important implication of the clinical staff).

High expertise of the team and development of important topic with high potential in basic and applied sciences. As such, the team notably developed new vaccine strategies based on their research work (it led to the development of a start-up as detailed below), and was also highly implicated/reactive during Covid crisis (along with other Cimi teams).

The team has a high involvement with industry: cofounder of a start-up, Minka Tx, partnership was set up in 2020 to pursue clinical studies. The team developed a partnership with the reinsurance company Scor in 2017 and in 2021, one patent was co-filed with Minka Tx related to Covid19.

Very good funding capacity: over 1,7 ME for the reporting period from national agencies (ANR, ANRS), european programs (H2020 EAVI 2015-2022 / H2020 ZIK alliance 2017-2021), several foundations (Sidaction, Foch, SFGM, ...) as well as industrial (Scor, Minka Tx).

Very good- excellent visibility-leaders are involved in many committees (president of COVARs, member of the academy of Medicine, member of the IUC, co-responsible for the SIRIC Curamus...), scientific editors (Medecines, Biomedecines), reviewers of high-profile journals (JCI, Blood, Nat. Comm, Nat. Immunol, ...) and grant application evaluation committees. Altogether, team members were invited for 10 oral communications (1 award-ASH meeting 2022) in national/international meetings and co-organisers of workshops/webinar. Involvement in international research activities (partner in 2 EU programs during the reporting period: H2020 EAVI and H2020 ZIK alliance).

Strong /cutting-edge technological equipment (mass cytometry, hyperion) used/developed by the team and overall, the publication record is very good: 128 publications including 62 as main authors during the reporting period (Front Immunol, Ebiomed, JI, PLoS Pathogens, Am J transplant, Molecular Psychiatry...). Of note, it also includes publications of collaborative studies performed with other Cimi Teams (team 4, team 6...).

The team has a high implication in teaching and training (including masters in Brazil and Guinée-Bissau) and all PhD students published at least one paper as first author during their thesis with an average of 3-4 including reviews.

Weaknesses and risks linked to the context

Based on the structure of the team (1 PI and 4 co-group leaders), the funding per PI/senior researcher may appear limited.

The outreach to the general public with regards to the team composition could have been more substantial or broad.

Overall, except for 1/2 researchers, the international visibility is limited (exemplified by invitation to conferences mostly national).

Considering the composition of the team (PI and 4 co-group leaders, and overall, 4 researchers with HDR), the number of PhD students (8 during the reporting period- 4 have already defended) and postdocs (only 1 during the reporting period) is relatively low.

Analysis of the team's trajectory

The team was created in 2019 with the merging of two historical Cimi Teams (PI: V. Vieillard and PI: B. Autran) to combine expertise in innate and adaptive immunity in response to human pathologies, and is localized in the CERVI building. The team is organised around the PI as well as four co-group leaders, to develop basic to clinical/translational research, in close collaboration with the hospital (and notably the clinical haematology department).

During the next term, continuation the research topic will be maintained, spearheaded by the PI and three co-group leaders around two main axes focusing on cellular immunity in emerging infections and cancer in immune-compromised patients. The objective of the first aim combines multiple cutting-edge approaches to focus on the modulation (and understanding of the mechanisms associated) of tolerance by NK receptors in several infections (CHIKV, DENV, M. Tuberculosis). The second aim will focus on studying virus-associated tumor environments (such as EBV, HPV) and develop immunotherapies in this context (CAR-NK approach). A young researcher (former PhD student in the team) should join the team in 2024 and apply for a permanent position,

and there is ongoing discussion for a senior researcher (DR2) to join the team during the next term. Overall, this is a broad program (from infections to cancer) with a promising combination of approaches from immune monitoring in infection patients, through functional and therapeutic studies. Finally, it is also important to note a clinical trial planned/ongoing with the start up.

RECOMMENDATIONS TO THE TEAM

The high diversity of projects endangers impact of individual projects for funding and the team should consider to focus on key stories to increase impact: basic, applied and translational research come with its own challenges, which may be difficult to realise at a high level within the same team (and actual composition/structure). Notably, the CAR NK project is evolving in a very competitive field, given this is a new horizon for the team and that the advantage of the strategy developed is not yet clear at the international level, it will represent an important challenge.

In relation with the previous point, the team should consider strategies to achieve equal involvement of all PIs in research, funding acquisition and outreach activities as well as the recruitment of young researchers/postdocs. In this context, considering the expertise level of the team, they should consider to apply to external/international fundings.

Team 10: Signaling and pathogenesis

Name of the supervisor: Mr Robert Weil

THEMES OF THE TEAM

Signalling pathways that control inflammatory and immune processes, with a focus on the NF- κ B pathway.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

No more post-doctoral fellows (0) or doctoral students (1) were trained in the current term than in the previous one.

No partnership has been established with the pharmaceutical industry.

The organization of the team has not changed during the current term, perhaps due to the temporary departure of the junior principal investigator. However, the team will be led by the main PI in the next term.

WORKFORCE OF THE TEAM: in physical persons at 31/12/2022

Catégories de personnel	Effectifs
Professeurs et assimilés	0
Maitres de conférences et assimilés	0
Directeurs de recherche et assimilés	1
Chargés de recherche et assimilés	2
Personnels d'appui à la recherche	2
Sous-total personnels permanents en activité	5
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	0
Post-doctorants	0
Doctorants	1
Sous-total personnels non permanents en activité	1
Total personnels	6

EVALUATION

Overall assessment of the team

The committee recognizes the originality and interest of the research projects carried out by Team 10.

There is a strong expertise in the field with good publication level.

The team has reacted very efficiently to the SARS-CoV-2 pandemic.

Strengths and possibilities linked to the context

The team is leading innovative scientific projects at the interface of immunology and oncology.

There was a strong reactivity during the pandemic to refocus some of their projects on SARS-CoV-2, leading to the repositioning of a drug that both targets the NF- κ B factor, thereby reducing the inflammation associated with the severity of Covid-19, and inhibits the entry of SARS-CoV-2 into cells (iScience 2022).

Excellent collaborations, some of which enabled the team to be associated with very good and top-level journals (iScience 2019; Science 2022).

Weaknesses and risks linked to the context

Limited scientific output: fifteen publications, including four in leading positions (2 original articles and 2 reviews). Fund raising limited to local calls (Cancéropole-Ile de France) and charitable foundations ("Ligue contre le cancer", and only a partnership in one ANR).

No post-docs and only one PhD student trained during the mandate.

Limited number of invitations to international conferences.

Although there are some patent opportunities (e.g. work published in iScience 2022), limited interactions with the non-academic world, particularly with industry and hospitals.

Unbalanced male/female ratio of 3:1 (the woman is a technician).

Analysis of the team's trajectory

The leader recognizes that the priority is to consolidate the team's human resources. The return of E. Laplantine, who has developed productive collaborations with renowned teams, is likely to increase the team's visibility and attractiveness. Priority should be given to recruiting and supervising post-docs and PhD students. The co-direction involving E. Laplantine removes the concerns associated with the departure of the current leader in 2027.

The scientific project is a continuation of work already carried out, although the three current axes have been grouped into two. The first axis aims to discover new regulators of the NF- κ B signaling pathway and their role in antiviral and antitumor immune responses. It comprises 3 projects concerning: (1) new regulators of NF- κ B activation complexes, with an interest in cancer on the one hand (DCUN1D5 and NEDDylation), and in infectious diseases on the other (infection by *S. pneumoniae*); (2) an upstream effector of antigen-mediated NF- κ B activation and its involvement in skin homeostasis; (3) novel regulators of Optineurin mitophagic function. The second axis aims to decipher the regulation of NF- κ B and Optineurin effectors during endoplasmic reticulum stress and their dysregulation in cancer. Although these projects are not funded, they are supported by a wealth of data already obtained, solid collaborations, and some of them should be submitted for publication soon. They will provide fundamental information on the NF- κ B signaling pathway and could have important applications in cancer and infectious diseases.

RECOMMENDATIONS TO THE TEAM

Researchers need to participate more actively in conferences to improve the team's visibility. The team should improve fund-raising. Team should more emphasize on collaboration/interaction with non-academic world. The committee encourages investigation of untapped fields and topics beyond the current focus of the team.

Team 11: Dynamics, structure and molecular biology of fungal invasion
 Name of the supervisor: Mr Allon Weiner

THEMES OF THE TEAM

The team focuses on understanding *Candida albicans* invasion of host cells making use of high-end microscopy studies. The team has been created in October 2018 as an ATIP-Avenir Team and was renewed for two more years in 2021.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The team was recruited to Cimi after the issuing of the previous report.

WORKFORCE OF THE TEAM: in physical persons at 31/12/2022

Catégories de personnel	Effectifs
Professeurs et assimilés	0
Maitres de conférences et assimilés	0
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	0
Sous-total personnels permanents en activité	0
Enseignants-chercheurs et chercheurs non permanents et assimilés	1
Personnels d'appui non permanents	0
Post-doctorants	0
Doctorants	1
Sous-total personnels non permanents en activité	2
Total personnels	2

EVALUATION

Overall assessment of the team

This is a small team, who has focussed on understanding the invasion of *Candida albicans* and has delivered two interesting publications on the topic in *Cell Microbiol* (2019) *Nat Commun* (2022), which constitutes very good productivity for the size of the team.

Strengths and possibilities linked to the context

The focus on the core interest of the team has yielded two interesting publications (*nat Commun*, *Cell Microbiol*) and led to a high ranking of the PI for a permanent position, which he obtained. The team has developed a fully automated imaging platform for live cells in a BSL2 environment, and offers training in microscopy and image analysis to users from other Cimi research teams. This live-cell imaging approach has enabled the team to understand the invasive lifestyles and invasive niches occupied during epithelial infection by *Candida albicans*.

Weaknesses and risks linked to the context

It was a small team with limited resources and limited time available due to the funding.

Analysis of the team's trajectory

This small team did well considered the size and temporal limits and this success led to the recruitment of the PI for a permanent position. The transition to a permanent job will offer the possibility to write more grants and employ more personnel. The team will integrate into team 8, which will allow deployment of their technology on malaria parasite biology and further development of their candida work. For developing the full potential of the group, the acquisition of additional grants and recruitment of PhD students//postdocs will be essential.

RECOMMENDATIONS TO THE TEAM

With the permanent position the PI can build a larger team by writing grants and including working with Master students, recruiting international PhD students and postdocs on fellowship. The PI should use this unique opportunity to build momentum on their recent work. He should also integrate into the work of the other teams where his technological knowhow will benefit their projects. While involving himself into Plasmodium work, he should also develop his Candida work further.

Team 12: Immunity & microbiota ecology

Name of the supervisor: Mr Martin Larsen

THEMES OF THE TEAM

The team focuses on the cross-talk between gut microbiota and the immune system, especially at early life or after FMT (Fecal Microbiota Transplantation).

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Not applicable.

WORKFORCE OF THE TEAM: in physical persons at 31/12/2022

Catégories de personnel	Effectifs
Professeurs et assimilés	0
Maitres de conférences et assimilés	1
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	0
Sous-total personnels permanents en activité	1
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	0
Post-doctorants	1
Doctorants	2
Sous-total personnels non permanents en activité	3
Total personnels	4

EVALUATION

Overall assessment of the team

This is an internal team, created in 2020 by Martin Larsen (previously member of Team 6 headed by Guy Gorochoy). It is a very small team (only one permanent) that has benefited of excellent European and national grants.

Strengths and possibilities linked to the context

The team published four articles with a team member as last or first author, among which one Microbiome (2018). Despite its small size, the team has succeeded in raising substantial European (3 ANR-EraNet/JPI, 2 of which as coordinator) and national (such as 2 ANR as coordinator) funding (more than 4 M€, including 1.5 M€ for the team).

Since 2020, the team provided training for nine master students, three PhD and two post-docs, which is highly commendable given the small size of the team and the limited time in the unit. One PhD student has completed a thesis; he published three articles of which one as first author and presented his work at national conferences.

Weaknesses and risks linked to the context

This is a very small team with only one permanent member with a large teaching burden.

Analysis of the team's trajectory

The team will merge with the team of Delphine Sauce with whom it has already established strong collaborations.

RECOMMENDATIONS TO THE TEAM

This is a very good idea to fuse with D. Sauce team.

CONDUCT OF THE INTERVIEWS

Dates

Start: 29 November 2023 at 08:00

End: 30 November 2023 at 18:30

Interview conducted: on-site

INTERVIEW SCHEDULE

Interview day 1: 29th of November 2023
8h50 at the CIMI gate, 91 Boulevard de l'Hôpital, 75013 Paris

- 9h00 – 9h10** **Hcéres committee welcome**
Room: Salle Bordeaux 508, 5th floor, 105 Bd de l'hôpital
- 9h10 – 9h30** **Hcéres committee meeting**
Room: Salle Bordeaux 508, 5th floor, 105 Bd de l'hôpital
Closed-door meeting
- 9h35 – 9h40** **Hcéres rules and procedures by J. Dutrieux**
Room: Salle Bordeaux 508, 5th floor, 105 Bd de l'hôpital
Public session (all unit members)
- 9h40 – 10h40** **Administrative and scientific presentation of the unit's achievements and future by O. Silvie**
 40min presentation
 20min discussion
Room: Salle Bordeaux 508, 5th floor, 105 Bd de l'hôpital
Public session (all unit members)
- 10h40 – 11h00** **Committee debriefing and coffee break**
Room: Salle Bordeaux 508, 5th floor, 105 Bd de l'hôpital
Closed-door meeting

Teams audition #1			
<i>Public session (15min presentation + 15min discussion)</i>			
Time	Room	Team Number	Presentation by
11h00 – 11h30	Bordeaux 508	8-11	O. Silvie – A. Weiner
11h35 – 12h05	Bordeaux 508	2	A. Aubry
12h10 – 12h40	Bordeaux 508	5	M.C. Dieu-Nosjean
12h45 – 13h15	Bordeaux 508	6	G. Gorochev

- 13h15 – 14h25** **Lunch break and committee debriefing**
Room: Salle Bordeaux 508, 5th floor, 105 Bd de l'hôpital
Closed-door meeting

Teams audition #2			
<i>Public session (15min presentation + 15min discussion)</i>			
Time	Room	Team Number	Presentation by
14h30 – 15h00	Bordeaux 508	1-12	D. Sauce – M. Larsen
15h05 – 15h35	Bordeaux 508	9	V. Vieillard
15h40 – 16h10	Bordeaux 508	10	R. Weil

- 16h10 – 16h45** **Committee debriefing and coffee break**
Room: Salle Bordeaux 508, 5th floor, 105 Bd de l'hôpital
Closed-door meeting
- 16h50 – 17h20** **Meeting with institutions representatives**
Room: Salle Bordeaux 508, 5th floor, 105 Bd de l'hôpital
Closed-door meeting
- 17h25 – 18h30** **Committee debriefing**
Room: Salle Bordeaux 508, 5th floor, 105 Bd de l'hôpital
Closed-door meeting

18h30 **End of day 1 Interview**

20h15 **Dinner**

*Location: Restaurant “Chez Lili et Marcel”, 1 Quai d’Austerlitz, 75013 Paris
Committee alone*

Interview day 2: 30th of November 2023
8h40 at the CIMI gate, 91 Boulevard de l’Hôpital, 75013 Paris

Teams audition #3			
<i>Public session (10min presentation + 10min discussion)</i>			
Time	Room	Team Number	Presentation by
8h55 – 9h15	<i>Bordeaux 508</i>	3	A. Boissonnas
9h20 – 9h40	<i>Bordeaux 508</i>	7	B. Salomon
9h45 – 10h05	<i>Bordeaux 508</i>	NC 3	B. Gamain

10h05 – 10h25 **Committee debriefing and coffee break**

*Room: Salle Bordeaux 508, 5th floor, 105 Bd de l’hôpital
Closed-door meeting*

Meeting with unit staff		
<i>(In the absence of managing staff)</i>		
Time	Room	Meeting
10h30 – 11h30	<i>Bordeaux 508</i>	Meeting with ITAs <i>(in French)</i>
11h30 – 12h30	<i>Bordeaux 508</i>	Meeting with researchers
12h30 – 13h30	<i>Bordeaux 508</i>	Meeting with PhD students and postdoctoral fellows

13h30 – 14h30 **Lunch break and committee debriefing**

*Room: Salle Bordeaux 508, 5th floor, 105 Bd de l’hôpital
Closed-door meeting*

14h30 – 15h15 **Visit of the unit’s premises**

Closed-door meeting

15h15 – 16h00 **Meeting with the unit direction**

*Room: Salle Bordeaux 508, 5th floor, 105 Bd de l’hôpital
Closed-door meeting*

16h00 – 18h30 **Redaction of the final report**

*Room: Salle Bordeaux 508, 5th floor, 105 Bd de l’hôpital
Closed-door meeting*

18h30 **End of the interview**

PARTICULAR POINT TO BE MENTIONED

The PI of team 4 (Ms Béhazine Combadière) was not present during the visit.

GENERAL OBSERVATIONS OF THE SUPERVISORS

Marie-Aude Vitrani
Vice-Présidente Vie institutionnelle et démarche
participative
Sorbonne Université

à

Monsieur Eric 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

Paris, le 26 février 2024

Objet : Rapport d'évaluation CIMI - Centre d'immunologie et de maladies infectieuses.

Cher Collègue,

Sorbonne Université vous remercie ainsi que tous les membres du comité HCERES pour le travail d'expertise réalisé sur l'unité de recherche « CIMI ».

Sorbonne Université n'a 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

Marie-Aude Vitrani
Vice-Présidente Vie institutionnelle
et démarche participative



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