

EVALUATION REPORT OF THE UNIT
GMGM - Génétique moléculaire, génomique et
microbiologie

UNDER THE SUPERVISION OF THE
FOLLOWING ESTABLISHMENTS AND
ORGANISMS:

Université de Strasbourg, Centre national de la
recherche scientifique - CNRS

EVALUATION CAMPAIGN 2022-2023
GROUP C

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In the name of the expert committee¹ :

Frédéric Boccard, Chair

For the Hcéres² :

Thierry Coulhon, President

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

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

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

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

MEMBERS OF THE EXPERT COMMITTEE

Chairperson:

Mr Frederic Boccard, CNRS, Gif-sur-Yvette

Experts:

Mr Alan Dobson, University College Cork Irlande

Mr Didier Flament, Ifremer (representative of CoNRS)

Mr Marc Lemaire, Université Claude Bernard-Lyon 1 (representative of CNU)

Mr Franck Letourneur, Inserm, Paris

Mr Robert Lightowlers, Newcastle University

HCÉRES REPRESENTATIVE

Mr Yacine Graba

CHARACTERISATION OF THE UNIT

- Name: Molecular Genetics, Genomics, Microbiology
- Acronym: GMGM
- Label and number: UMR 7156
- Number of teams: 6
- Composition of the executive team: Mr Ivan Tarassov

SCIENTIFIC PANELS OF THE UNIT

SVE Sciences du vivant et environnement

SVE3 Molécules du vivant, biologie intégrative (des gènes et génomes aux systèmes), biologie cellulaire et du développement pour la science animale

THEMES OF THE UNIT

The unit GMGM investigates various fundamental aspects of the organisation, evolution, function or dysfunction of genomes, in both prokaryotic and eukaryotic systems. More specifically, GMGM pursues a double objective: (1) to study the molecular mechanisms of genome evolution and adaptation of organisms to environmental stresses, on model systems (bacteria and yeasts) and microbial communities in environments of interest; and (2) to understand the molecular mechanisms underlying cellular trafficking and intracellular macromolecular dynamics, using eukaryotic models (yeast and human cells), with potential applications in the biomedical field.

HISTORIC AND GEOGRAPHICAL LOCATION OF THE UNIT

The Joint Research unit (UMR 7156 'Molecular Genetics, Genomics, Microbiology' – Génétique Moléculaire, Génomique, Microbiologie, GMGM – supported by the University of Strasbourg and the CNRS was created in 2005 by merging the two former units FRE 2326 and 2375. In 2005, GMGM was headed by Mr Serge POTIER, professor at the University of Strasbourg. Mr Ivan Tarassov was appointed director in 2013 and 2018 with Mr Philippe BERTIN, professor at the University of Strasbourg, acting as a deputy-director. The historical organisation in two departments was abandoned when the unit was regrouped in 2018–2019 in the 'Institut de Physiologie et de Chimie Biologique' – IPCB – building, on the esplanade campus of the University, near other UMRs of biology – IBMC, IBMP – or chemistry – ISIS, Institut de Chimie – .

RESEARCH ENVIRONMENT OF THE UNIT

GMGM is strongly involved in National investments for science that shape the local research environment. In the framework of the PIA1 National program, the Laboratory of Excellence – LabEx – MitoCross, in operation from 2012 to 2021, was coordinated by Dr. I. Tarassov – GMGM –. This Labex involved 3 teams from GMGM – Entelis/Tarassov, Becker, Schacherer – and 3 teams from two other institutes nearby – IBMP and IBMC – ; it aimed to study various aspects of mitochondrial functions and dysfunctions.

In 2017, in the framework of the PIA3 National program, the LabEX MitoCross together with two other LabExs from Strasbourg – INRT and NetRNA – was successful in the creation of an IMCBioGraduate School – EUR, Ecole Universitaire de Recherche –. The project, which received funding of 6.5M€, includes the development of several courses, practical work, Master and PhD internships and thematic schools, as well as the creation of specific Masters.

In 2021, the project IMCBio+ – 'Integrative Molecular and Cellular Biology' – was selected as 'Interdisciplinary Thematic Institute' – ITI – of the IDex UNISTRA. It brings together a large community of scientists and clinicians from the University of Strasbourg. The IMCBio+ ITI federates the IMCBio University School funded in 2017 and four LabEx – INRT, MitoCross, NetRNA, and HepSYS – .

The IMCBio+ ITI project is funded for the period 2021–2028 – 32 M€ – . It aims to promote excellent research coupled with multidisciplinary training at the interface of biology. The four LabExs, nowadays termed as 'Research Clusters', comprise 66 teams and 200 researchers/professors, representing approximately 30% of the workforce in biological sciences and health in Strasbourg.

The Labex MitoCross will have a support of 4.5 M€ for the period 2021–2028. Within the IMCBio+ ITI, the specific research project of the MitoCross cluster is divided into four main axes aimed at describing – 1 – the evolutionary diversity of mitochondrial systems, – 2 – their macromolecular machinery, – 3 – the mechanisms of molecular trafficking involving mitochondria, and – 4 – the application of the newly acquired knowledge to better understand mitochondrial dysfunctions and to remedy them. Particular emphasis is being placed on methodological innovation and the development of new tools.

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

Permanent personnel in active employment	
Professors and associate professors	7
Lecturer and associate lecturer	3
Senior scientist – Directeur de recherche, DR – and associate	5
Scientist – Chargé de recherche, CR – and associate	5
Other scientists – Chercheurs des EPIC et autres organismes, fondations ou entreprises privées –	0
Research supporting personnel – PAR –	7
Subtotal permanent personnel in active employment	27
Non-permanent teacher-researchers, researchers and associates	3
Non-permanent research supporting personnel – PAR –	3
Post-docs	9
PhD Students	14
Subtotal non-permanent personnel	29
Total	56

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

Employer	EC	C	PAR
Université de Strasbourg	11	0	4
CNRS	0	10	5
Inserm	0	1	0
Total	11	11	9

UNIT BUDGET

Recurrent budget excluding wage bill allocated by parent institutions – total over 6 years –	836.0
Own resources obtained from regional calls for projects – total over 6 years of sums obtained from AAP idex, i-site, CPER, territorial authorities, etc. –	2646.0
Own resources obtained from national calls for projects – total over 6 years of sums obtained on AAP ONR, PIA, ANR, FRM, INCa, etc. –	1481.0
Own resources obtained from international call for projects – total over 6 years of sums obtained –	2453.0
Own resources issued from the valorisation, transfer and industrial collaboration – total over 6 years of sums obtained through contracts, patents, service activities, services, etc.–	136.0
Total in euros – k €–	7,546.0

GLOBAL ASSESSMENT

The UMR 'Génétique Moléculaire, Génomique, Microbiologie' – GMGM – is a moderately sized UMR, with 57 members – excluding master and rotation students – including 31 permanent staff – 11 lecturers, 11 researchers and 9 PAR – that are now located in the Institut de Physiologie et Chimie Biologique – IPCB – building on the Strasbourg University campus. The GMGM unit is organised around common services and structured in six research teams. The unit functions according to well-defined rules of procedures, with an executive board composed of the direction team and team leaders. Management of human and financial resources is performed by a centralised secretary. The unit benefits from recurrent funding from the MESRI and CNRS and important additional funding obtained by teams from various grants – 75% of the unit's financial resources, not including institutional salaries –. The unit focuses – i – on the molecular characterisation of the mechanisms of evolution and adaptation of organisms to environmental stresses and ii) on the molecular analysis of cell trafficking and intracellular dynamics of macromolecules. This thematic diversity stems from the history of the unit resulting from the fusion of two distinct entities, departments previously located in two different buildings, which so far have kept their specificities. The new proximity within the IPCB building since 2019 should allow a reinforcement of the unit collective dynamics and facilitate its functioning, notably by allowing the development of a common scientific strategy so that the unit is more than the sum of these teams. However, the recent health crisis has not been favourable for the establishment of strong interactions between the different entities. While GMGM is a relatively small unit, there is room for improvement in the dissemination of information about the unit's operations.

The visibility and attractiveness of the unit are excellent. GMGM is very well inserted in the ecosystem of research and training in Biology at the University of Strasbourg. GMGM plays an important role in training with many professors and lecturers involved in teaching and administration at the university. GMGM benefits from the dynamics of the various projects funded by the PIA: Labex, EUR, IRI with its associated Research Clusters. Three of the six teams of the unit are affiliated to the Labex/Research Cluster MitoCross directly benefiting from the support of this project which has been renewed until 2028. GMGM teams have obtained numerous contracts during the period evaluated, most of them at the local or national level (including ANR, FRM, AFMs), as well as an ERC consolidator grant and an international ANR contract with Swiss and German teams. During the evaluation period, the unit has recruited three new CNRS researchers and three lecturers. Following the termination of the team headed by P. Bertin, the team headed by Gilles Charvin from the IGBMC has been recruited in 2022 (Gilles Charvin will assume the direction of GMGM from January 2023). Moreover, the unit welcomes each year a significant number of Master students (>50 during the period), PhD students (>30) and postdoctoral students (>20). All the groups have established fruitful collaborations in France or at the international level. Members of the unit are invited to present their work in academic institutions or at international and European congresses (>50 talks), and contribute to organising major international events (including Gordon Research Conference, International Conference on Yeast Genetics and Molecular Biology).

The research carried out by the unit is excellent even if there is a disparity between the different teams, ranging from outstanding to very good. The teams have published nearly 200 publications, some of them in renown journals such as Nature, PNAS, EMBO J., eLife, Nature Com., Nature Microbiology, Cell reports, NAR, etc. The scientific production also serves numerous (>200) communications and oral presentations at national and international conferences.

The inclusion of the unit's research in society is excellent. Most teams have interactions with non-academic partners (expertise and collaborations with several companies (Airbus, Space X, Biobrasseur, Lesaffre, Equiseq), and have participated in various actions toward the society (1000 researchers in schools, Ose la Recherche,

OpenLAB program, Women in Science). One team has developed a patent licenced by the Dynacure company, aiming at developing novel therapies for myotubular and centronuclear myopathies.

DETAILED EVALUATION OF THE UNIT

A - CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

Ten main recommendations were indicated. The responses brought by the unit are generally difficult to assess as the unit has neither made the effort to argue point by point, nor presented in a synthetic way aspects that would have allowed assessing how recommendations were addressed. As a consequence, the committee could in many cases not assess how recommendations from the previous Hcéres report were dealt with. In these instances, statements from the unit are stated in brackets.

- Increase the number of papers co-published by several teams:

'Several publications were done in common, notably an important publication presented in the portfolio.'

- Maintain/increase publications in highly rated journals:

'Many publications were done in > 10 IF journals (Nature, NAR, Nature Com, etc.)'

- unit not enough involved in EU programs:

For the previous term, teams were involved in several international projects. For the period of evaluation, one team obtained an ERC grant. Other projects are described in the section below.

- Only 78 keynote/invited talks:

Considering the size of GMGM, this number is rather considered remarkable by the unit.

—Involvement in international networks:

'Teams of the unit are strongly involved in several networks, as specified in the teams' activities descriptions, so this remark obviously does not correspond to the reality.'

—Lobbying industrials:

'All teams are doing very active attempts in this sense, reflected by patents and pre-maturation projects mentioned in the units' report.'

- Interaction and laboratory life to be improved:

'The one-building project may resolve the most of these problems'

- GMO application:

The procedure has been finalised in 2017.

- No accreditation for national or international programs:

'This is not true, as specified in team-specific comments. Additionally, through the labex MitoCross, the unit currently participates in the application of EUR in the frame of the PIA3 program.' Involvement of the unit in other actions is described.

—Lack of scientific long-term policy and setting up a SAB:

'To have a real long-term scientific policy one need a consequent budget and the facility to recruit, so far the institutional subvention represent less than 25% of our annual budget, and is merely sufficient to support the common equipment. The main policy in these conditions is to naturally support the successful teams' projects and to try to resolve ongoing problems of the lack of technical staff. "

'Establishment of a SAB is certainly a good idea. However the scientific subjects addressed by the unit's teams require participation of several specialists in very different fields ranging from structural biology to ecology and will also be rather costly if organized on a regular meetings' way.'

B – EVALUATION AREAS

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

Assessment on the unit's resources

GMGM is a relatively small sized unit whose teams have been successful in obtaining different types of funding and in recruiting permanent and non-permanent staff to conduct their research projects. The unit had on December 2021 57 members (excluding master and rotation students), including 31 permanent staff (11 lecturers, 11 researchers and 9 PAR). GMGM was composed by several common services and six research teams. The unit is now entirely located in a single building (IPCB) and occupies around 1500 m2. The unit benefits from recurrent sources of funding from the MESRI and CNRS. Additional funding obtained by teams from various grants represents more than 75% of the unit's financial resources, not including institutional salaries. Three groups are also supported by the Labex MitoCross.

Assessment on the scientific objectives of the unit

The scientific objectives of the unit are to study various fundamental aspects of the organisation, evolution, and function of genomes, with an emphasis on environmental and biomedical applications. While each research team has a clearly defined project, there is no clear statement about the scientific strategy for the whole unit. The fact that all teams are now in the same building should facilitate the emergence of a unified scientific vision.

Assessment on the functioning of the unit

Despite its small size (about 57 members) and the regrouping of the teams in a single building, the functioning of the unit has remained dispersed as it was before; there is room to improve the dissemination of information about the unit's operations and to better associate all parties to decisions concerning the organisation of the unit. The GMGM unit is organised in six research groups and common services. The unit functions according to the rules of procedures that have been defined in 2021. The executive board is composed by the direction team and team leaders. Management of human and financial resources is performed by a centralised secretary. Common services are distributed among permanent research and technical staff. Staff members are responsible for some common equipment.

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

Strengths and possibilities linked to the context

Research teams of GMGM use a broad range of approaches (genetic, genomic, molecular biology, biochemistry and bioinformatics) to perform fundamental research with an emphasis on mechanisms with potential applications in health and environment.

The overall budget of the unit remained relatively stable during the last 5 years. In addition to the recurrent funding from the supervising bodies, all teams of the unit benefited from grants and contracts, as well as from numerous partnerships with charity and public funding organisations. Furthermore, the Research Cluster Mitocross also indirectly benefited the unit.

For a unit composed of six teams, they hosted during the period an impressive number of PhD students (>30), postdocs (>20) and Master students (>50) who complemented the staff scientists and engineers of the six teams.

GMGM benefits from technology platforms located nearby (proteomics, DNA- and RNA-sequencing, mass spectrometry, bioinformatics, antibody generation, microscopy and imaging, etc.). GMGM either directly, or through Idex-LabEx instruments participates in establishing, optimisation and functioning of these platforms and, in return, benefits from preferential 'internal' service quotations.

GMGM plays an important role in training with many professors and lecturers involved in teaching and administration at the university. All research staff of the unit contribute to training.

Weaknesses and risks linked to the context

A number of important items of equipment have been acquired by individual teams. The unit does not seem to have set up a system of overheads to finance joint actions, for example, for the purchase of equipment or attracting new groups independently of MitoCross.

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

Strengths and possibilities linked to the context

The unit plays an important role within the Strasbourg scientific community by its involvement in the different PIA programs (Labex MitoCross, EUR IMCBio, IIT IMCBio+) and by contributing to the implementation and functioning of platforms. The head of the unit leads the Research Cluster MitoCross.

Contracts and subventions contribute to more than 75% of the unit's financial resources. One member obtained an ERC Consolidator Grant while most of the other academic projects are funded locally (LIA, Labex, Idex, Région Alsace) or nationally (ANR, AFM, FRM, CNRS).

All the teams work in collaboration with other renowned teams, nationally or internationally, that bring complementary expertise or other models of interest.

The teams have a diversity of methodological expertise covering all relevant topics to perform excellent research in modern biology.

Weaknesses and risks linked to the context

For historic reasons, the unit shows an important thematic diversity that should not become a factor of dispersion.

Funds obtained from contracts are not shared but managed exclusively by the contracting teams.

Recurrent financial support to the unit from the supervising bodies must be at least stabilised, in order to maintain and update existing basic equipment (autoclave, centrifuges) and to replace obsolete vital equipment or to acquire new equipment.

The number of technicians who left the unit has only partially been compensated.

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

Strengths and possibilities linked to the context

The unit complies with the principles of human resources management recommended by the supervising bodies, including respecting gender equality and non-discrimination, in matters of training, internal mobility and career development for its staff.

The unit is attentive to the working conditions of its staff, their health, safety and the prevention of psychosocial risks. The unit has a single document – 'Document Unique' – containing an assessment of professional risks, which is updated annually.

The research themes of the six teams encompass different research fields and models/organisms, which implies that the prevention of occupational risks, health and safety at work requires the unit to act in an organized and responsible way. The prevention assistant AP implements all the legal requirements related to the protection of staff health and safety.

The informatics security is managed as described in the specific document 'Charte Informatique', approved by the two supervising bodies.

Weaknesses and risks linked to the context

GMGM is located in a building of the University and thus relies on University staff for different logistic operations, whose availability has not been optimal in the past.

The actual unit is the regroupment of two departments located previously in two different buildings. Their integration in the IPCB building two years ago could be a way to help the mixing of people from these two entities, but it seems, on the contrary, that the two remain as two separate cohorts preventing any strong interactions.

No unit council has been held for two years and a lack of communication/consultation has been pointed out by the technical staff. The health crisis seems to have slowly but strongly disrupted this communication: for example, despite the presence of rules and organisational documents, it appears that the application of these rules seems complicated (for example for newcomers in the laboratory). The lack of consultation was also cited, with technical staff learning of new decisions on the day that they were to apply them.

EVALUATION AREA 2: ATTRACTIVENESS

Assessment on the attractiveness of the unit

The attractiveness of the unit is excellent. The unit has recruited six new scientists and a new team has been recruited in 2022. More than 50 Master students, 30 PhD students and 20 postdocs were hosted in the unit during the period. The members of the unit are invited to present their work in academic institutions or at international and European congresses (>50 talks). Members of the unit contributed to organize major international events (including Gordon Research Conference, International Conference on Yeast Genetics and Molecular Biology). All teams have established fruitful collaborations in France or at the international level.

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

Strengths and possibilities linked to the context

Over the period 2016–2021, the unit has submitted more than 10 proposals in response to international calls from CNRS, Université de Strasbourg, among which three have been funded.

One team leads an international PRCI ARN project involving researchers from France, Switzerland and Germany.

Multiple members of the unit participated or chaired in organising/scientific committees of prestigious European and international congresses (e.g. '27th tRNA Conference', Gordon Research Conference, '28th International Conference on Yeast Genetics and Molecular Biology', '12th World Congress on Targeting Mitochondria', 'Levures, Modèles et Outils', etc.).

The unit reports more than 200 communications of various types to national and international conferences, including 50 invited talks. This high number of invitations assesses the excellent reputation and appeal of the unit.

All research teams have established international collaborations.

Weaknesses and risks linked to the context

The space available in the unit does not allow the recruitment of many teams to reinforce the specific themes.

Since the recruitment of the new team will be funded by the MitoCross Cluster, it restricts the scientific theme of the team to be recruited.

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

Strengths and possibilities linked to the context

GMGM was very successful in recruitment during the reference period. Three new permanent CNRS researchers and three new lecturers (Maître des Conférences) were recruited by different teams.

The unit is very efficient in attracting many Masters (>50) and PhD (>30) students including from abroad, which provides an excellent opportunity for the groups to supervise good students. The unit also attracted postdocs (>20) and hosted foreign visiting professors (2).

Ten agents received a promotion in the period.

The hosting policy will be reinforced by the location of research groups in a single building.

In 2022, due to the financial support (400 k€) of the LabEx-Cluster MitoCross, a call will be launched to welcome a junior chair, with the aim to set up a new team with a mitochondria - related project fitting the goals of the LabEx.

Weaknesses and risks linked to the context

None identified

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

Strengths and possibilities linked to the context

Contracts and subventions contribute to more than 75% of the unit's financial resources (institutional salaries not included).

One team obtained an ERC Consolidator Grant while most of the other academic projects are funded locally (LIA, Labex, Idex, Région Alsace) or nationally (8 ANR (4 as project coordinator, 3 AFM, 1 FRM, 1 CNRS)).

One team leads an ANR international PRCI grant.

Weaknesses and risks linked to the context

Most projects are funded at the local or national level; given the large number of collaborations at the international level, the number of international and European funded research projects could be increased.

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

Strengths and possibilities linked to the context

The unit plays an important role within the Strasbourg scientific community through its involvement in the different PIA programs (Labex MitoCross, EUR IMCBio, ITI IMCBio+) and by contributing to the implementation and functioning of platforms. They have therefore an easy access to the network of cutting-edge instruments on the Esplanade campus, such as NGS (IBMP and IGBMC), microscopy (IBMP and Faculty of Pharmacy), metabolomics (IBMP), crystallography and mass spectrometry (IBMC).

The move to a single building has permitted the complete reorganisation of the common services, i.e. a single managing service, a centralised laundry-sterilisation service and an independent informatics service integrated in the new DATACenter of the Esplanade site of the Strasbourg University.

Weaknesses and risks linked to the context

Part of the technical staff is involved in the functioning of the platforms and consequently have less time for the development of the teams' research projects.

EVALUATION AREA 3: SCIENTIFIC PRODUCTION

Assessment on the scientific production of the unit

The scientific production of the unit is globally excellent, with team productions varying from outstanding to very good.

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

Strengths and possibilities linked to the context

The unit has an excellent scientific output with a total of 190 publications in peer-reviewed scientific journals, including highly cited journals such as Nature, PNAS, EMBO, eLife, Nature Com. etc. The level of scientific production varies from teams to teams, from outstanding to very good.

The scientific production also includes more than 200 communications, more than fifty oral communications and more than 20 participations in organizing committees of scientific events.

Weaknesses and risks linked to the context

None identified

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

Strengths and possibilities linked to the context

The scientific production of the unit seems to be shared between its personnel, according to the contribution of the people to the study, but this aspect of the scientific production has not been synthesised for all the unit in the report.

Weaknesses and risks linked to the context

None identified

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

Strengths and possibilities linked to the context

The teams of the GMGM unit do not directly use animal models, but often participate in collaborations including such models. In all cases, the collaborating laboratories own all updated permissions for hosting and manipulation with these materials, including the rules of animal care and human material transfer agreements. The unit strictly follows the rules of the two supervising bodies (Strasbourg University and CNRS) in terms of deontology of research. Members of the units and its Direction took part in several meetings to meet the common rules. All publications mentioned in the application and in the Data table are dully deposited at the institutional Open Access databases (HAL and UnivOak).

Weaknesses and risks linked to the context

None identified

EVALUATION AREA 4: CONTRIBUTION OF RESEARCH ACTIVITIES TO SOCIETY

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

Even if the unit is primarily focused on fundamental research, the overall contribution of the research activity to society is excellent. Most teams have interactions with non-academic partners – expertise and collaborations with several companies (Airbus, Space X, Biobrasseur, Lesaffre, Equiseq), and have participated in various actions toward the society (1000 researchers in schools, Ose la Recherche, OpenLAB program, Women in Science). One team has developed products for the socio-economic world (one patent licenced by Dynacure) aiming at developing novel therapies for myotubular and centronuclear myopathies.

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

Strengths and possibilities linked to the context

Several teams have established collaborations and have provided expertise for different companies or non-academic partners (Biobrasseur, Lesaffre, Equiseq).

Three patents were deposited and one team has a patent licenced by Dynacure aiming at developing novel therapies for myotubular and centronuclear myopathies

The collaboration with Airbus, Space X and the International Space University concerning the study of methanogenic strains in the international space station has received much local media attention. One patent was deposited Isolated genes and transgenic organisms for producing biofuels.

Weaknesses and risks linked to the context

None identified

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

Strengths and possibilities linked to the context

Members of one team are inventors of one patent that has been licensed to the company Dynacure to develop novel therapies addressing myotubular and centronuclear myopathies.

Weaknesses and risks linked to the context

None identified

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

Strengths and possibilities linked to the context

Several teams of the unit are engaged in outreach activity towards different categories in the general public through different initiatives or manifestations: 'Fête de la Science,' meetings and internship of high school students as part of the '1000 researchers in schools' or 'Ose la Recherche' forum or the initiative 'Women in Science'. The unit also participated in the 'OpenLAB program' of the graduate school 'ED-Vie-Santé' that brings together high school students and doctoral students to perform practical courses. Other members of the unit are part of a project of the Strasbourg scientific community to develop the program 'Pour un dialogue Science et Société sur la recherche en train de se faire'.

Weaknesses and risks linked to the context

None identified

C – RECOMMENDATIONS TO THE UNIT

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

As the unit can count on the support of the Labex MitoCross for the recruitment of new teams, GMGM will have to coordinate with the management of the Labex to define the future orientations of the unit, in harmony with those of the Labex. These orientations, strategic for the future development of the unit, will have to be discussed with the supervising bodies of GMGM.

Both for the evolution of the internal teams and for the recruitment of external teams, the unit could benefit from the setting up of a Scientific advisory board to accompany it on these issues.

To reinforce the feeling of belonging to the same unit, it would seem appropriate to take an overhead on the contracts in order to be able to carry out emblematic actions on the whole unit, for example to support projects or the acquisition and maintenance of equipment.

The relocation of all teams in the same building, but on several floors, has not allowed the level of interaction that could have been expected. It will be necessary to implement managing actions and procedures to meet this important challenge to increase the overall dynamics of the unit.

The termination of the team headed by P. Bertin will weaken the theme of the study of bacterial populations and their evolution in different environments. The management of the unit will have to consult with the supervising bodies to explore the means of consolidating this important research axis at the level of the Strasbourg University.

An improvement of the organisation of the unit, of the communication between the teams and between the staff would allow a reinforcement of collective dynamics.

Recommendations regarding the Evaluation Area 2: Attractiveness

The GMGM unit must continue to work in a highly coordinated manner with the other Strasbourg biology UMRs to ensure access to state-of-the-art equipment and support for research and training.

Several teams need increasing the level of publication to increase their visibility and attractiveness.

Several teams could explore with their foreign collaborators the possibilities of establishing international networks conducive to large-scale funding.

Improvement unit organisation and internal communication between the teams and between the staff should ultimately allow improving the attractiveness of the unit.

Recommendations regarding Evaluation Area 3: Scientific Production

Several teams should be able to increase the level of publication. Given the size of the unit, publication strategies can be discussed in the executive board or during internal seminars.

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

The projects developed by the unit have a strong basic science component. Nevertheless, several teams have been successful and active in contributing research activity to society. Other GMGM teams could benefit from these experiences and work together to strengthen interactions with non-academic partners, develop products for the socio-economic world and participate in various events and debates with society.

RESPONSES TO SUPERVISING BODIES CONCERNS

No concerns expressed by supervising bodies

TEAM-BY-TEAM ASSESSMENT

Team 1: Adaptations and interactions of microorganisms in the environment
 Name of the supervisor: Mr. Stéphane, Vuilleumier

THEMES OF THE TEAM

The research focus of the team involves the molecular characterisation of the degradation and adaptation of microorganisms to environmental contaminants/pollutants, with a particular emphasis on C1 halogenated pollutants in the context of methylotrophic metabolism. Different culture-dependent and independent omics based approaches such as metagenomics, transcriptomics and proteomics are being employed to characterise bacterial isolates and bacterial communities for the bioremediation of various micropollutants. Projects involve molecular characterisation of the pathways involved in the degradation of chloromethane, metformin and dichloromethane at the molecular level, together with the analysis of how microbial community respond to the effects of environmental disturbances.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The team have very clearly considered the recommendations from the previous evaluation report, particularly with respect to the development of research activities in the area of microbial ecotoxicology, and in the potential horizontal gene transfers of the degradation pathways. In addition, collaborations have been undertaken with different relevant research groups to increase their capacity to study metabolite identification. With respect to the recommendation to supervise more graduate students, four PhD students graduated during the assessment period, which is good.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	2
Lecturer and associate lecturer	0
Senior scientist (Directeur de recherche, DR) and associate	1
Scientist (Chargé de recherche, CR) and associate	1
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	0
Subtotal permanent personnel in active employment	4
Non-permanent teacher-researchers, researchers and associates	1
Non-permanent research supporting personnel (PAR)	1
Post-docs	1
PhD Students	5
Subtotal non-permanent personnel	8
Total	12

EVALUATION

Overall assessment of the team

The scientific quality of the work is very good/excellent and is of an international standard in the field of research. The team continues to work on the mechanism of microbial adaptation to C1 halogenated pollutants, and has also begun to focus on the isolation of bacteria that are capable of degrading micropollutants and other recalcitrant pollutants. Visibility and non-academic activities are excellent.

Strengths and possibilities linked to the context

The team visibility is excellent. It is very well established scientifically. This is reflected in the number of talks at conferences (international 12; national 2) and invited seminars (international 7; national 1) and a large set of interdisciplinary collaborative interactions, including IBMC, IBMP, ITES in Strasbourg, the University of Clermont Auvergne, Rennes, BRGM Orleans and INSA Toulouse and international collaborations with teams from the universities of Bayreuth, East Anglia, Heidelberg, Idaho, Luxembourg and Michigan. Funding has been obtained at both local and national level (ADEME/BRGM, Idex, ANR, EC2CO INSU), as well as at the European level (Interreg). Visibility is also attested by the involvement of permanent staff in teaching at the University of Strasbourg, with responsibilities for the discipline of Microbiology and for two Masters degree programmes.

The overall scientific productivity is very good to excellent. The team are following three main research lines involving the degradation of chlorinated methane, characterisation of enzymatic pathways for the degradation of pharmaceutical compounds and analysis of the structures of microbial communities in environments exposed to environmental perturbation and contamination. An interesting new focal area for the team is the study of the cloud microbiome. The total number of publications including local, national and international collaborations is 52, and involve all team members. Some papers of the team proper projects (i.e. published with a team member as first or last author) have been published in good quality journals in the research field (ISME 2018, Scientific reports 2017).

The non-academic activities within the team are excellent. The team was involved in MMARS1, a collaborative program between the International Space University, and two companies namely Airbus 'Defense and Space' and Space Tango, which was supported by the Euro-metropole of Strasbourg. This was the first study of its kind to investigate the growth of methanogenic micro-organisms under conditions similar to those of the Mars subsurface. It attracted a high level of media interest, including TV, Magazine and newspaper articles. The study of the biodegradation potential of halogenated aliphatic compounds in a former industrial site in (Varenes-le-Grand) was also of societal importance. A patent application involving the discovery of novel dehalogenases with biotechnological applications has been filed.

Weaknesses and risks linked to the context

Much of the multidisciplinary involved in the research studies being undertaken by the team involve collaborations with external groups.

Research funding is over relying on local and national funding streams.

Only a limited number of the papers published by the team over the period have been heavily quoted.

RECOMMENDATIONS TO THE TEAM

The expert committee recommends that the team actively explore the possibility of leveraging their existing European and international networks to explore the possibility of acquiring EU funding through different relevant Horizon 2020 programmes.

The expert committee recommends where possible, to bring some of the relevant expertise in the organic-bioorganic chemistry areas in house and embed it within the team.

The expert committee recommends that the team targets publications in high quality journals to increase the citations and visibility of the research work.

The expert committee recommends that the team attempts to contribute more actively to outreach activity including interacting with the general public.

Team 2: Molecular ecophysiology of microorganisms
 Name of the supervisor: Mr. Philippe Bertin

THEMES OF THE TEAM

Research activities of the team consist in the isolation and description of original microbial strains from various environments and characterisation of their role in polluted ecosystems by a combination of descriptive, comparative and functional genomic approaches, and in their potential use in biotechnological applications.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The team did not fully respond to the recommendations of the previous Hcéres committee, mainly with regard to the increase in team size, the increase in the number of high-profile publications and the recruitment of docs and postdocs. It should be noted, however, that the team welcomed three students in the framework of co-supervised PhDs with foreign universities.

By contrast, on the societal significance, the team responded to the previous recommendations by the development of two applied research projects with non-academic partners.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	1
Lecturer and associate lecturer	0
Senior scientist (Directeur de recherche, DR) and associate	0
Scientist (Chargé de recherche, CR) and associate	0
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	1
Subtotal permanent personnel in active employment	2
Non-permanent teacher-researchers, researchers and associates	1
Non-permanent research supporting personnel (PAR)	0
Post-docs	0
PhD Students	0
Subtotal non-permanent personnel	1
Total	3

EVALUATION

Overall assessment of the team

Overall, the scientific quality of the work is very good. The team works on the isolation of microorganisms from various environments, defining their roles in contaminated ecosystems by employing comparative and functional genomics and exploring the possibility of their use in biotechnological applications. The non-academic and outreach activities are excellent through the development of applied projects and dissemination to the general public.

Strengths and possibilities linked to the context

The team is very well established scientifically and has a very good visibility. Research funding was obtained from the Genoscope, CNRs and SATT. The implementation of interdisciplinary approaches is effective through national and international collaborations and contributes to the team's visibility (Univ. Montpellier, Univ. Bordeaux, Genoscope, UFZ Leipzig, CNR Roma, Univ. Oran)

The scientific production with a total of fifteen papers is very good. Publications involves all the team members. A majority of the publications appear in very good journals, with nine publications (including in FEMS, Microbiology, Frontiers in Microbiology, Research in Microbiology) led by a team member.

The contribution of research activities of the team to society is excellent with the development of two applied research projects with the support of the regional valorisation and transfer agency SATT-connectus for the screening of metagenomic libraries in order to identify peptides of biotechnological interest and for the development of biosurfactants. In addition, the team actively contributes to outreach activities including interacting with the general public within society.

Weaknesses and risks linked to the context

The scientific reputation of the team is not reflected in the presentation of talks or invited at conferences, or invited seminars either at a national or international level. The team did not took advantage of its visibility to attract PhDs and postdocs during the last term.

Only a limited number of the papers have been published in high-ranking journals (FEMS Microbiology Reviews) and few have been cited over the period.

Research fundings over rely on local and national funding streams.

RECOMMENDATIONS TO THE TEAM

The committee will not give recommendation as this team will not be renewed for the next term and would like to acknowledge the work performed by Philippe Bertin over the years.

Team 3: Intraspecific variation and genome evolution
 Name of the supervisor: Mr. Joseph Schacherer

THEMES OF THE TEAM

The research activities of the team mainly focus on studies on (i) Genetic and phenotypic diversity at a population level and (ii) characterisation of the genetic basis and architecture of complex traits using yeast as a model organism. This allows the team to explore the origin of 'missing heritability' and perform large-scale functional genomics in diverse strain backgrounds.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Three recommendations were formulated:

1) *to publish in the top journals*

This has been addressed with the team publishing papers in highly reputed journals (Nature; Molecular Biology and Evolution; Genome Biology; eLife; Genome Research).

2) *to attract a full time researcher to the tea.*

This has been addressed with the team succeeding to attract and recruit a CNRS permanent researcher.

3) *to develop its interactions with the economic world*

This has been addressed with the project on Kombucha fermentations involving the BioBrasseur company and interactions with the Lessafre and Solinest companies.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	3
Lecturer and associate lecturer	2
Senior scientist (Directeur de recherche, DR) and associate	0
Scientist (Chargé de recherche, CR) and associate	1
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	1
Subtotal permanent personnel in active employment	7
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	2
Post-docs	5
PhD Students	5
Subtotal non-permanent personnel	12
Total	19

EVALUATION

Overall assessment of the team

The scientific quality of the work is outstanding and the team is internationally very well-renowned in this field of research. The team works in the area of yeast genomics and is following two main lines of research a) Genetic and phenotypic diversity at a population level and b) characterisation of the genetic basis and architecture of complex traits using yeast as a model organism.

Strengths and possibilities linked to the context

The scientific reputation of the team is outstanding at national and international levels, first evidenced by the large number of oral communications at conferences and invited seminars (40), given by team members at both national and international events. The team leader has been involved in the organisation of four national and international symposium/meetings in the Yeast area. He is member of editorial boards of three journals (PLoS One, Yeast, Frontier Fung. Biol.). The outstanding scientific visibility of the team is also reflected by its participation in a number of ongoing national and international research projects, with funding coming from renowned local programs (Mitocross Labex, IMCbio EUR, IMCbio+ ITI), competitive national ANR sources (PhenoVar, Brett Adapt, RecombFun), and prestigious international grants (EU ERC Consolidator, NIH, Weizman Institute). The team has a very good implications in the University of Strasbourg with two professors and three assistant professors with heavy teaching duties and one member being Dean of the Life Science Faculty. The two professors are also members of the National University Council (CNU section 65). During the assessment period, the involvement of the team in training through research was excellent as seven PhD students were trained and an assistant professor awarded the HDR. The team continues to develop as it succeeded in attracting and recruiting a young CNRS permanent researcher and a new assistant professor.

The team scientific production is outstanding. The research activities of the team mainly focus on studies on a) Genetic and phenotypic diversity at a population level and b) characterisation of the genetic basis and architecture of complex traits using yeast as a model organism. This research has led to several major findings and to the development of new tools including algorithms that allowed the team to explore the origin of 'missing heritability' data and also to perform large-scale functional genomics in diverse strain backgrounds. In regards of the teaching and administrative duties of team members, the total number of publications (43) produced during the assessment period is outstanding, with some team-leading papers (first and or last authored) published in outstanding/excellent journals (Nature – 2x –, Molecular Biology and Evolution, Genome Biology, eLife; Genome Research). Interdisciplinary and collaborative interactions are reflected in publications involving national and international collaborations (University of Washington, Seattle and the Weizmann Institute).

The team is involved in a project with an industrial partner in the area of the microbial ecology of Kombucha fermentations and have good interactions with bigger companies 'Solinst, Lessafre'.

Weaknesses and risks linked to the context

No weaknesses at the scientific and funding levels. The team works in a competitive field but efficiently manages its international competitors.

The team is composed of University teachers with teaching duties, one CNRS full-time researcher, but with only one person (IE) as technical help.

Public outreach activities are limited.

RECOMMENDATIONS TO THE TEAM

The committee advises the team to keep ambitious goals for publication in highly reputed journals and successful applications to prestigious funding programs.

The team needs more technical support.

Team 4: Intracellular traffic of RNA and mitochondrial pathologies
 Name of the supervisors: Ms. Nina Entelis and Ivan Tarassov

THEMES OF THE TEAM

The team focuses on RNA biology associated with the mitochondrion and bacteria. These are linked through an interest in conserved systems particularly around RNA-binding proteins and noncoding RNAs. Mitochondrial disease therapeutics are highlighted through an interest in molecular genetic manipulation. The team is also strongly involved in molecular technology, with interests in comparative RNA and RNP structural biology and imaging techniques.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Recommendations from the previous report were encouragement to pursue the diverse team activities, including development of focused well-constructed projects using yeast and human models, international and national collaborations, exploitation of biomedical aspects of their research, and training through research. As suggested, the team has retained its scientific focus, has developed international collaborations, continuing to develop its connections with MitoCross and winning further funding through IMCBio in 2021. The Team has also maintained its involvement in research training at masters and PhD level but other teaching commitments are light. The team has, however, not been unable to exploit further potential biomedical aspects of its research.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	0
Lecturer and associate lecturer	0
Senior scientist (Directeur de recherche, DR) and associate	3
Scientist (Chargé de recherche, CR) and associate	1
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	3
Subtotal permanent personnel in active employment	7
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	0
Post-docs	2
PhD Students	2
Subtotal non-permanent personnel	4
Total	11

EVALUATION

Overall assessment of the team

The team continues to focus on RNA biology in mitochondria and bacteria. The scientific production, visibility and non-academic activities of the team were all assessed as very good to excellent.

Strengths and possibilities linked to the context

The visibility and attractiveness of the team is very good to excellent. Members of the team are well recognised by both their international and national peers as evidenced by invitations to 9 international conferences, one online and a similar number of national meetings during the assessment period. Presentations at high quality meetings such as the GRC were also included. Five students received their doctorate degrees during the assessment period, which is a reasonable number for the size of the team. Students and postdoctoral associates are well recruited through the various networking schemes. Postdoctoral students and researchers have also presented their data as oral presentations or as posters at many of these meetings. The team is well embedded in many important research networks at all levels (Labex MitoCross, Idex, Caramel-CHU, IAE-CNRS) which helps with recruitment of good students and postdoctoral research associates. The team has done an excellent job in attracting research funding from numerous highly competitive sources such as ANR, IAE-CNRS etc. The move into a new building in 2019 will undoubtedly lead to an increased appeal to attract researchers to the unit.

The scientific production of the team is very good to excellent. The major findings of the teams during the assessed period are (i) the Identification of a major mitoribosomal biogenesis factor (NAR 2020); (ii) the characterisation of a CRISPR cleavage system (NAR 2022); (iii) computational prediction of tertiary interactions in RNA structure (Non-coding RNA, 2021); and (iv) a review of non-coding RNA import into mitochondria (Cells 2019). The team is listed to have generated 28 publications, fifteen as first or corresponding author, including methods related papers (5), book chapters (3) and reviews (5). In addition, one Principal Investigator was recruited to the unit at the end of 2017 and had previously produced two high quality publications at Wurzburg during the period.

The non-academic activities of the team are very good to excellent. The team has been involved in numerous schemes to discuss their science with teachers and students as part of outreach and public engagement. Members of the team have submitted an application to an ANR call in 2022 to fund outreach and science communication studies in the Alsace area.

Weaknesses and risks linked to the context

The majority of the publications in this assessment period were in reviews, book chapters, methods or journals with low visibility and have not been highly cited.

It would be good to see more international invitations as plenary or keynote speakers for members of the team.

The team has also flagged that it will be losing its two most senior members in the forthcoming assessment period.

RECOMMENDATIONS TO THE TEAM

Members of this team have had a good track record for publication and again there is evidence of a few high-quality publications but this assessment period was not as strong as in previous periods, although this may have been affected by COVID issues. It is recommended that where possible the team should look to increase its output in higher-level journals to increase their reputation and visibility. This should be possible, as the team is successful in establishing international collaborations. The establishment of novel mtDNA editing techniques in the past 2 years should also be strongly considered by members of this team as it will reduce the amount of risk associated with trying to optimise other techniques.

Team 5: Membrane trafficking and lipid signalisation
 Name of the supervisor: Ms. Sylvie Friant

THEMES OF THE TEAM

The team studies human genes involved in rare diseases (myopathy, neuropathy, ciliopathy, genetic blood diseases) with a focus on genes encoding molecules involved in membrane and intracellular trafficking. This is achieved using a variety of experimental models including humanised yeast *saccharomyces cerevisiae*, and primary patient cells.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Three recommendations were formulated:

1) Maintaining the excellent quality of the published papers

This has been addressed with publications for example in *Nature Communications* (2016), *Human Molecular Genetics* (2017), *Human Mutation* (2019, etc.

2) Continue to develop fruitful collaborations and to develop well-focused projects and maintain collaborations.

This has been addressed with collaborations involving IGBMC and CRBS (Strasbourg), Institut Curie Paris, TRI Genotoul Platform Toulouse and the Universities of Sydney, Helsinki, Jijel and Batna.

3) Continue to participate in the everyday life of the university and to host master and PhD students.

This has not been well addressed with a limited number of PhD students being recruited into the team.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	0
Lecturer and associate lecturer	0
Senior scientist (Directeur de recherche, DR) and associate	1
Scientist (Chargé de recherche, CR) and associate	1
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	1
Subtotal permanent personnel in active employment	3
Non-permanent teacher-researchers, researchers and associates	1
Non-permanent research supporting personnel (PAR)	0
Post-docs	0
PhD Students	1
Subtotal non-permanent personnel	2
Total	5

EVALUATION

Overall assessment of the team

The team perform original research, using *Saccharomyces cerevisiae*, primary patient cells and tissues as models to study human genes involved in rare diseases and genes encoding for effectors linked to membrane trafficking. The scientific quality of the work is excellent and is of an international standard in this field of research. Non-academic contribution is also excellent and visibility, although very good, deserves improvements.

Strengths and possibilities linked to the context

The visibility of the team is very good. The team is very well established scientifically which is reflected in their ability to obtain funding to implement their research (ANR, AFM-Telethon, Idex Fellowships, Chinese Ministry of Research & Education). The scientific reputation of the team reflected in the number of talks at conferences and invited seminars (30) which have been given by the team leader (13) or team members (17) at national and some international events, and a large network of interdisciplinary collaborative interactions, involving local (IGBMC, CNRS and INSERM Strasbourg), national (Institut Curie Paris, TRI Genotoul Platform Toulouse) and international collaborations (University of Sydney, University of Helsinki, Universities of Jijel and Batna in Algeria).

The scientific production of the team is excellent. The team possesses relevant expertise in the use of yeast as a model for the functional study and/or validation of new genes or variants of unknown significance identified from sequencing data in patients with diseases via humanisation of yeast. They have successfully leveraged this expertise in a number of relevant fruitful collaborations that led to excellent publications (Journal Clinical Investigation, Journal Experimental Medicine, EMBO Molecular Medicine, eLife, . PNAS). The total number of publications is good (19), seven being signed in leading positions, including a Nature Commun., 2016 and a Human Mol Gen, 2017). Publications involves all the team members.

The non-academic activity of the teams is very diverse and assessed as excellent. The team has engaged in a number of non-academic partnerships which have societal impacts. This is evidenced through their interactions with Equiseq in the area of rare genetic diseases in horses. The team also filed a patent application relating to a polypeptide for use in the treatment of myopathies, licenced by Dynacure. The also team broadly engages in outreach activity with relevant groups of stakeholders, including the general public. Eight high school students have been housed by the team over the period.

Weaknesses and risks linked to the context

The team appears to lack attractiveness to Doctoral School candidates, perhaps reflecting some problems with the visibility of the team.

Only two PhD students have graduated during the reporting period.

The team appears to be over reliant on a limited amount of funding streams.

RECOMMENDATIONS TO THE TEAM

The expert committee recommends that the team actively explore mechanisms by which they can attract PhD students. They should explore the EU funding schemes in Horizon 2020, such as the Doctoral Networks programme. The committee is aware that the team has had difficulties in converting good students to PhD studentships. One suggestion is to try and assure that the good students receive the very best level of training for their PhD assessment exams with relevant internal guidance.

The expert committee recommends that the team continue to target publications in highly recognised journals, particularly as senior authors, so to increase the citations and visibility of the research work.

Team 6: Dynamic of nanomachines of of the translation apparatus and metabolic dialogues

Name of the supervisor: Mr. Hubert Becker

THEMES OF THE TEAM

The team studies aminoacyl-tRNA Synthetases (aaRSs) and Aminoacyl-tRNA Transferases (AATs) enzymes in yeasts, pathogenic fungi and bacteria. The team focuses in particular on the nonconventional roles played by mitochondria-relocalised aaRSs forms, and on the role of AATs in the aminoacylation of specific cellular compounds and the consequence on the virulence of fungal and bacterial opportunistic pathogens.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Four recommendations were formulated:

1) The only CNRS researcher of the team should be given more publicity in the publications.

This is positively in progress since this researcher i) is associated to 8 publications (some in excellent journals), ii) is in charge of one the three team's research axes, iii) is the co-first author of a manuscript currently under review in Brain.

2) The team should take advantage of its excellent national and international visibility to attract more postdocs.

This has been addressed by recruiting three postdocs.

3) The team should strengthen its visibility in the social and economic environment.

This has not been addressed.

4) The team should continue to develop national and international collaborations. It should continue to strengthen its focus on innovative projects

These points have been addressed with collaborations with leading experts in their fields, resulting in co-authored publications. The team has strengthened its focus on innovative and competitive projects such as studying the non-translational functions of aaRSs when relocated to particular cellular compartments and the link between virulence and AATs activities with collaborations and applications in the biomedical field.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	1
Lecturer and associate lecturer	1
Senior scientist (Directeur de recherche, DR) and associate	0
Scientist (Chargé de recherche, CR) and associate	1
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	1
Subtotal permanent personnel in active employment	4
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	0
Post-docs	1
PhD Students	1
Subtotal non-permanent personnel	2
Total	6

EVALUATION

Overall assessment of the team

The team investigated innovative aspects of aminoacyl-tRNA synthetases (aaASs) and aminoacyl-tRNA transferases (AATs), in the yeast *S. cerevisiae* and in pathogenic fungi/bacteria. They established and published an elegant mitochondrial genome-editing method to study mitochondrial echoforms of aaASs. The total number of publications and the quality of the work is excellent. The team is internationally very well-renowned in this field of research.

Strengths and possibilities linked to the context

The team has an excellent scientific reputation, first evidenced by its involvement in a number of current research projects funded with recurrent local grants from prestigious programs (Mitocross Labex, IMCbio EUR, IMCbio+ ITI) and from competitive national sources (ANR, FRM). Its scientific visibility is also reflected by the number of communications (22), speaker invitations (4) and chaired sessions (3) at international meetings, and invited seminars (3) in foreign institutes. PhD students of the team were awarded four poster prizes at international meetings and two PhD prizes. With respect to interdisciplinary and collaborative interactions, the team has implemented numerous local, national and international collaborations to develop their research activities. During the assessment period, the involvement of the team in training through research was very good as three Postdocs, seven PhD students and 23 undergraduate students were recruited and trained. All the Professors and assistant professors, and PhD students as well, are involved in teaching at the University of Strasbourg. The team leader also had important administrative responsibilities at the university with the direction of two masters and the biochemistry department (for 2 years).

The scientific production of the team is excellent. Research activities of the team focuses on studies of Aminoacyl-tRNA Synthetases (aaRSs) and Aminoacyl-tRNA Transferases (AATs) and were developed in three research axes, each managed by one permanent researcher: i) the study of nontranslational functions of cytoplasmic/mitochondrial dual-localized aaRSs, ii) study of human pathogenic variants of aaRSs using humanised yeasts, iii) research on AATs of fungal and bacterial human pathogens. This research led to several major findings in each axis, namely the development of a mitochondrial genome-editing method to study

mitochondrial echoforms of aaASs (eLife 2020, axis 1); the finding that mutations in a human aaRSs gene are involved in neurodevelopmental disease (Am. J. Hum. Genetics 2020, axis 2); and the discovery of a new ergosteryl-amino acid synthases enzyme family (PNAS 2020, axis 3). These publications were highlighted by a cover banner (eLife) and by press releases (eLife and PNAS) from the University of Strasbourg and the CNRS. The total number of publications (16), including collaborations with other teams of the unit and/or with world-renowned leading experts in their fields, is excellent. All team members contribute to publications.

Public outreach activities and relations with the non-academic/industrial world are limited. The BiG Mito Split-GFP technology has already been the subject of MTA agreements with various US laboratories.

Weaknesses and risks linked to the context

The team is small and composed of two university teachers with teaching duties, one CNRS full-time researcher, and only one CNRS technician. The team needs more technical support.

The team works in a competitive field and is in direct competition with international laboratories with higher funding.

RECOMMENDATIONS TO THE TEAM

The team should keep ambitious goals for the publication of their results in the continuity of their recent successes.

Even if the team has current midterm secured funding (Labex, ANR), the committee advises the team to take advantage of their current worldwide networks to investigate the possibilities of obtaining EU funding.

CONDUCT OF THE INTERVIEWS

Date

Start: October 14, 2022 at 9 am

End: October 14, 2022 at 6 pm

Interview conducted: online

INTERVIEW SCHEDULE

- 8:00 - 8:15 Preliminary meeting of the expert committee (closed hearing)
Attending: expert committee, Scientific Officer (Yacine Graba, Scientific Officer – SO)
- 8:15- 8:30 Presentation of the Hcéres evaluation to the unit (Yacine Graba, Scientific Officer)
Attending: expert committee, SO, representatives of institutions and all unit members
- 8:30 - 9:15** Presentation of the research unit by the unit director, Ivan Tarassov (including 15 min questions)
Attending: expert committee, SO, representatives of institutions and all unit members
- 9:15 - 9:30** **Break**
- 9:30 - 10:00** Scientific presentation Team 1 (Stéphane VUILLEUMIER)
(15 min presentation + 10 min questions + debriefing of the committee)
Attending: Team members, expert committee, SO, director of unit, representatives of Institutions
- 10:00 - 10:30** Scientific presentation Team 2 (Philippe BERTIN)
- 10:30 - 11:00** Scientific presentation Team 3 (Joseph SCHACHERER)
- 11:00 - 11:30** Scientific presentation Team 4 (Nina ENTELIS)
- 11:30 - 12:00** Scientific presentation Team 5 (Sylvie FRIANT)
- 12:00 - 12:30** Scientific presentation Team 6 (Hubert BECKER)
- 12:30 - 1:30 p.m.** **Lunch/Committee debrief**
- 1:30 p.m. - 2:15 p.m.** Parallel meetings (3 subcommittees)
- Meeting with technical and administrative personnel (in French 45 min)
Attending: Technicians, Engineers, Administrative staff, sub-committee 1 of expert committee, SO
- Meeting with thesis students and postdocs (45 min)
Attending: PhD students and postdocs, sub-committee 2 of expert committee, SO
- Meeting with researchers and professors (in English 30 min)
Attending: Researchers except team leaders, sub-committee 3 of expert committee, SO
- 2:15 p.m. – 3 p.m.** Meeting with the representatives of CNRS and UNISTRA

Attending: expert committee, representatives of Institutions, SO

- 3 p.m. - 3:30 p.m.** Meeting of the Committee (closed hearing)
Attending: expert committee, SO
- 3:30 p.m. - 4 p.m.** Meeting of the Committee with the head of the unit.
Attending: unit Director, expert committee, SO
- 4 p.m. - 4:15 p.m.** Break
- 4:15 p.m. – 6 p.m.** Deliberation of the Committee (closed hearing)
Attending: expert committee, SO
- 18:00 End of the visit

GENERAL OBSERVATIONS OF THE SUPERVISORS

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

Strasbourg, le 16 janvier 2023

Objet DER-PUR230023114 - GMGM - Génétique moléculaire, génomique et microbiologie

Réf. : RB/FF/ 2023-010

Rémi Barillon

Vice-Président Recherche,
formation doctorale et sciences
ouvertes

Cher Collègue,

Affaire suivie par:

Florian Fritsch
Responsable du département
Administration de la recherche
Tél: 03.68.85.15.19

florian.fritsch@unistra.fr

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

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



Rémi Barillon

Direction de la Recherche

4 Rue Blaise Pascal
CS 90032
F-67081 STRASBOURG CEDEX
Tél.: +33 (0)3 68 85 15 80
Fax: +33 (0)3 68 85 12 62
www.unistra.fr

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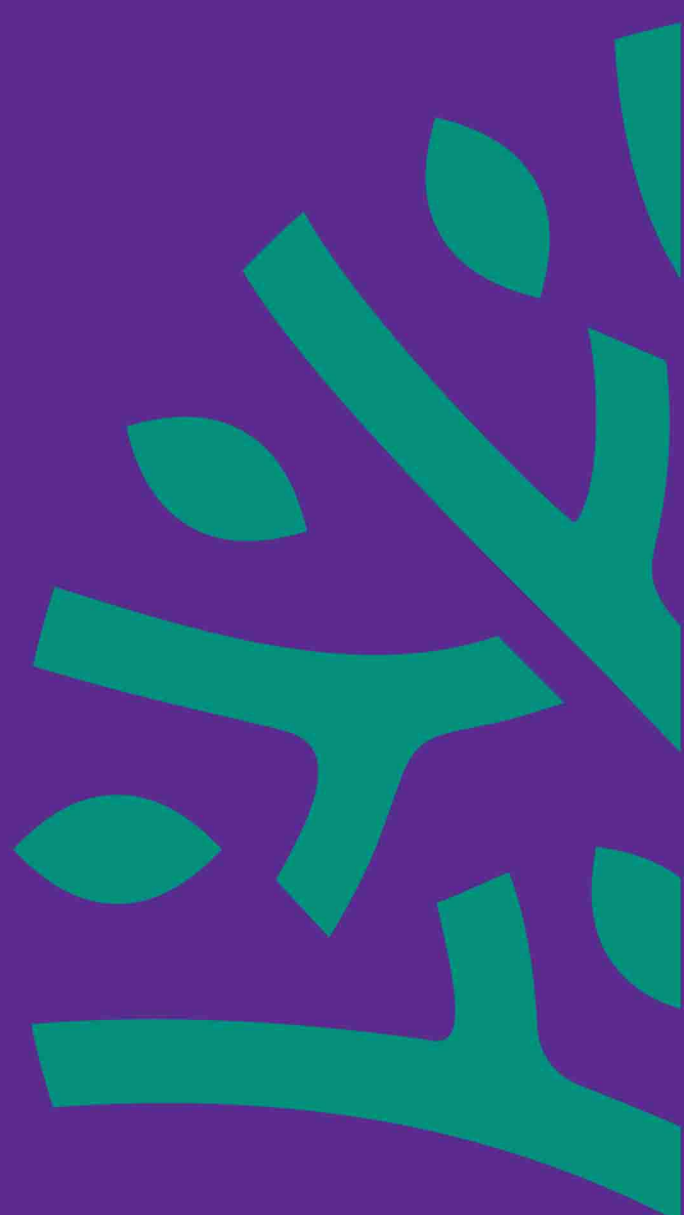
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2 rue Albert Einstein
75013 Paris, France
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