

EVALUATION REPORT OF THE UNIT  
IBMP - Institut de Biologie Moléculaire des Plantes

UNDER THE SUPERVISION OF THE  
FOLLOWING ESTABLISHMENTS AND  
ORGANISMS:

Université de Strasbourg

Centre national de la recherche scientifique -  
CNRS

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**EVALUATION CAMPAIGN 2022-2023**  
GROUP C

Report published on April, 26 2023



In the name of the expert committee<sup>1</sup> :

Pedro Puigdomenech Rosell, Chairman of the committee

For the Hcéres<sup>2</sup> :

Thierry Coulhon, President

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

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

<sup>2</sup> 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 Pedro Puigdomenech Rosell, Emeritus Professor, Spain

**Experts:** Ms Justine Bertrand-Michel, Inserm, Toulouse (supporting personnel)  
Mr Vincent Colot, CNRS, Paris  
Mr Martin Crespi, CNRS, Gif-sur-Yvette (representative of CoNRS)  
Ms Christine Foyer, University of Birmingham, United Kingdom  
Ms Kristina Kuehn Martin-Luther-Universitaet Halle-Wittenberg, Germany  
Mr Dominique Rolin, Université de Bordeaux (representative of CNU)  
Ms Lesley Torrance, Emeritus Professor, University of St Andrews, United Kingdom  
Mr Bruno Touraine, Université de Montpellier

## HCÉRES REPRESENTATIVE

Mr Steven Ball

## CHARACTERISATION OF THE UNIT

- Name: Institut de Biologie Moléculaire des Plantes
- Acronym: IBMP
- Label and number: UPR 2357
- Number of teams: 16
- Composition of the executive team: Ms Laurence Drouard (DU), Mr Philippe Giegé (DUA) and Ms Magali Daujat (DUA).

## SCIENTIFIC PANELS OF THE UNIT

SVE2 Productions végétales et animales (agronomie), biologie végétale et animale, biotechnologie et ingénierie des biosystèmes,

SVE2\_2 Biologie végétale fondamentale et appliquée et productions végétales.

## THEMES OF THE UNIT

The IBMP is devoted to fundamental research of the highest quality on plant molecular biology. Topics covered by the teams are gene expression and RNA regulation, plant metabolism and signalling, organelles and virology. These topics take into account in general societal concerns and expectations. Many biological questions addressed by the teams deal with the response to biotic or abiotic stresses and the improvement of plant growth to reach sustainable food production. The understanding of biodiversity and the use of non-model plants has also been developed in the institute, notably in the last years.

## HISTORIC AND GEOGRAPHICAL LOCATION OF THE UNIT

The IBMP is one of Europe's pre-eminent research centres studying plant biology since its creation in 1987. The IBMP investigates various areas of plant-virus interactions, mitochondria biology, RNA biology, protein degradation and secondary metabolites. The model plant *Arabidopsis thaliana* is the subject of most research activity although other model plants and plant crops are increasingly being studied. Individual research teams are supported by technology platforms that include gene expression analysis, protein expression, structural biology, metabolomics, microscopy and imaging, bio-image and bio-informatics and plant production.

The "Institut de biologie moléculaire des plantes" (IBMP) was located on two sites in Strasbourg until September 2015. Around 80% of the personnel was gathered on the main building (Rue du Général Zimmer), the remaining 20% of the personnel was located 10 minutes away, at the Botanical Institute (Rue Goethe). In 2015, the main building has been enlarged with 1 200 m<sup>2</sup> of additional surface. This extension allowed to bring together all teams and platforms of the IBMP in a single building, to reorganize and optimize the microscopy and metabolomics platforms, to create a larger conference room and an area for recreation and informal discussion, to build 17 controlled modern growth chambers equipped with LEDs and to create space for new teams.

As part of the Institut National des Sciences Biologiques (INSB) of CNRS, the IBMP, with about 160 persons, is the only unit entirely administered by CNRS dedicated to plant research. The institute is associated with the University of Strasbourg (Unistra) and affiliated with the Doctoral School of Life Sciences and Health (ED 414).

## RESEARCH ENVIRONMENT OF THE UNIT

The IBMP unit benefits from an exceptional research environment in the Strasbourg site as a component of the research framework that allowed the creation of Strasbourg Idex structure. IBMP is a key actor of this exceptional research network, with 44 researchers or professors from 6 teams belonging to 2 of the 4 Labex research excellence clusters of the IMCBio+ Interdisciplinary Thematic Institute. An interdisciplinary thematic institute in molecular and cellular biology, both in health and plant sciences, named IMCBio+, federates 5 big institutes, among which IBMP, providing an exceptional research environment to these laboratories, in connexion with the 4 Labex and the IMCBio Graduate School. This biopole provides an excellent environment that both allows the mobilization of interdisciplinary expertises for the research programs of the institute and connects advanced student training to research. The whole framework (IMCBio graduate school, Labex, IMCBio+ pole) is a powerful tool to increase attractiveness for good students and young scientists of high potential.

IBMP has developed 5 shared platforms (genome expression, protein expression and purification, bioinformatics, microscopy, plant imaging and mass spectrometry) and 3 shared technical facilities (structural biology, genome editing, plant production), that are accessible to the two closely located institutes (IBMC and GMGM). IBMP has access to other platforms, as the proteomics platform at IBMC. This platform network provides the IBMP researchers with adequate equipment to undertake efficiently their research programs. These platforms are part of the scientific core facilities network (CORTECS) of the university of Strasbourg (Unistra), which is open to collaboration and services in partnership with the SATT Conectus Alsace. The unit is keeping an internal policy of sharing most of the funds from grants and providing free access to platforms and to most of the consumables.

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

<b>Permanent personnel in active employment</b>	
Professors and associate professors	5
Lecturer and associate lecturer	11
Senior scientist (Directeur de recherche, DR) and associate	17
Scientist (Chargé de recherche, CR) and associate	13
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	42
<b>Subtotal permanent personnel in active employment</b>	<b>88</b>
Non-permanent teacher-researchers, researchers and associates	12
Non-permanent research supporting personnel (PAR)	8
Post-docs	3
PhD Students	41
<b>Subtotal non-permanent personnel</b>	<b>64</b>
<b>Total</b>	<b>152</b>

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

Employer	EC	C	PAR
CNRS	0	30	39
Université de Strasbourg	16	0	3
<b>Total</b>	<b>16</b>	<b>30</b>	<b>42</b>

## UNIT BUDGET

Recurrent budget excluding wage bill allocated by parent institutions (total over 6 years)	8 988
Own resources obtained from regional calls for projects (total over 6 years of sums obtained from AAP idex, i-site, CPER, territorial authorities, etc.)	1 972
Own resources obtained from national calls for projects (total over 6 years of sums obtained on AAP ONR, PIA, ANR, FRM, INCa, etc.)	7 135
Own resources obtained from international call for projects (total over 6 years of sums obtained)	1 432
Own resources issued from the valorisation, transfer and industrial collaboration (total over 6 years of sums obtained through contracts, patents, service activities, services, etc.)	950
<b>Total in euros (k€)</b>	<b>20 477</b>

## GLOBAL ASSESSMENT

The scientific strategy of the Institute of Molecular Biology of Plants (IBMP) of Strasbourg is based on the main scientific interests of IBMP teams both for fundamental and applied research projects.

The themes studied by the 16 teams of the Institute of Molecular Biology of Plants cover gene expression and RNA regulation, plant metabolism and signalling, organelles and virology. These subjects often take into account societal concerns and expectations. Many biological questions addressed by the teams relate to the response to biotic or abiotic stresses and the improvement of plant growth to achieve sustainable food production. The understanding of biodiversity and the use of non-model plants have also been developed at the institute, especially in recent years.

The human financial and equipment resources are overall adequate and can be presently considered excellent. However the present organisation does not yet stimulate enough collaborations between teams, notably there are few shared postdocs and PhDs. Interactions among PhD students and postdocs appeared also limited during the evaluation period. The implication of permanent researchers that are not group leaders in the scientific life of the unit was also limited. The functioning of the unit is therefore assessed as very good to excellent.

The scientific production of the UPR is excellent both in quantity and in quality. Over the period (2016-2021), the researchers (44) published 353 articles (275 original articles and 78 review articles), i.e. around 50 original articles per year. All the teams participate in this production as well as the doctoral students (1.6 publications per doctoral student). The journals are generally the best multidisciplinary or specialized journals in the field of plant biology (*Nature Communication*, *Nature Plants*, *Plant Cell* and *PNAS*). Indeed, 38 publications were highlighted by the CNRS-INSB on their website.

The unit obtained 6 Marie Curie actions, an ITN, an ERA-NET COFUND action and a PI obtained an ERC covering the period 2014-2019 showing some success with European funding. During this period at the national level, IBMP teams have 26 ANRs.

In the frame of Strasbourg Campus, the association of the unit with 2 Labex within the framework of Unistra Idex, MitoCross and NetRNA involves 6 IBMP teams while two Junior Chairs will be supported by these Labex for the period 2021-2028. 9 scholarships including theses and postdocs were obtained during the evaluation period for Labex calls.

Better interactions with the private sectors (2 labcoms) helped diversify the financing options for the teams which maintained their very good to excellent attractiveness.

The IBMP has improved its position on translational research which has become excellent. They have obtained 3 labcoms (Clean Stem, GreenTolerance and TerpFactory) and a series of applied research grants. Nevertheless, it remains possible to improve public awareness and its involvement in social debates, which currently remain at a good to very good level with actions at the level of the "Fêtes de la Science" and interaction with schools (declic program).

## DETAILED EVALUATION OF THE UNIT

### A - CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The last Hcéres evaluation of the IBMP made several recommendations that were considered by the unit although a more precise description of how this was taken into account could have been presented.

A major comment was linked to the scientific strategy of the unit and the coherence of the nomination of future group leaders as several may retire. The scientific strategy of IBMP is based on the main scientific interests of IBMP teams both for fundamental and applied research projects. Almost 60% of the funding sources are from academic and private companies' grants and these resources guide the projects without any specific choice of a particular area or transversal theme. The team leaders performed leading research on a variety of subjects from plant metabolism, organelles, virology, protein degradation, gibberellin, chromatin and RNA biology using multi-scale approaches going from the characterization of small molecules and complex molecular machines to the assessment of macroscopic phenotypes. The results obtained also lead to application-oriented innovative research projects, an aspect that has been increased with the creation of 3 Labcoms and many other smaller contracts as well as 4 patents and one software program, demonstrating the links with the private sector. The unit closed the previous "research departments" structures in order to facilitate interactions among all teams and promote collaborations between teams. However, only 4 of the 26 ANR contracts obtained during the evaluation period involved such collaborations, suggesting that there is a margin to improve interactions between teams. Nonetheless, around 25% of the publications involve more than 2 teams showing that the new organization has improved common scientific experiments.

Another recommendation was to increase collegiality and exchanges in addition to regular seminars at IBMP. They now have weekly presentations of PhD and Postdocs and group leaders meet once a month to improve the involvement of the team leaders in the scientific life of the unit. Also at least 2 one-day retreats of team leaders have been organized despite the Covid sanitary crisis. It was also recommended to improve the communication between the Unit Directors and PhDs and post-docs, but there was no specific action towards this goal.

Another recommendation based on the excellent science being done at IBMP was to increase the number of postdocs in the teams. In the Human Resources file, there are 22 Postdocs out of 425 personnel for the whole period and presently there are 9 postdocs for 160 personnel.

During the period 2015 – 2018, the IBMP staff was negatively impacted by a case of scientific misconduct and the previous Hcéres committee considered this aspect. The IBMP has taken several measures in relation to this case, including the closure of the incriminated team, and it has established robust managerial rules to avoid any future misconduct issue and to promote scientific integrity. The IBMP Management has set up a system for archiving on a dedicated storage place all the raw data of all research articles published by IBMP researchers. This archiving is accompanied by detailed declarative forms, specifying the involvement of each author in carrying out the experiments, analyzing the results and assembling the figures. The unit has overcome this difficult period successfully.

### B – EVALUATION AREAS

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

##### Assessment on the unit's resources

The human, financial and equipment resources are overall adequate and can be presently considered excellent. The platforms are of excellent quality overall and are well suited to the needs of the different teams.

### Assessment on the scientific objectives of the unit

The scientific objectives of the unit are to perform fundamental research in diverse areas of plant molecular biology. Indeed, IBMP is the only plant science institution in France that is exclusively run by the CNRS and as such, its main mission is to advance knowledge. The 16 teams cover an array of research topics in the fields of virology, metabolism, biology of organelles and cells, signaling, RNAs, gene expression and chromatin. The scientific strategy of the unit is very good overall, as it mainly remains the sum of that of each team. This concern was also raised by the previous Hcéres committee.

### Assessment on the functioning of the unit

During the period the unit improved its functioning through different actions. Departments were abolished which may improve the collaboration between teams. They developed a complete policy for ethic and scientific integrity. A big investment was done to protect scientific assets and computer systems (600 kEuros over the period), to provide VPN to all staff and to improve data storage solution (850TB). Despite these efforts, the present organisation does not yet stimulate enough inter team collaborations. The functioning of the unit is therefore assessed as very good to excellent.

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

#### Strengths and possibilities linked to the context

IBMP has five state of the art technology platforms and three technical facilities. It has a critical mass of nearly two hundred staff including researchers, teacher-researchers, engineers, technicians, doctoral and post-doctoral students. In addition to the purchase of large items of equipment, there is a regular purchase of more conventional frequently-used equipment. There is very good data storage. The S3 storage capacity also supports novel and original projects. CNRS provides financial support that maintains infrastructure but overall IBMP research is well supported by external funding.

#### Weaknesses and risks linked to the context

IBMP research is reliant on external funding and so all teams are actively engaged in applying for funds. However, there is only a low number of European ITN or ERC grants. The scientific subjects rely on past achievements. A culture towards the biological relevance of the work of the different teams and towards new models and crops is only starting.

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

#### Strengths and possibilities linked to the context

Many of the teams perform at the highest level and are therefore major international players in their respective fields of research. This is attested not only by the number of publications (more than 50 publications per year on average, around 10% of which are in journals with high visibility such as *Nature Comm*, *Nature Plants*, *Plant Cell*, *Dev Cell*, *Genes & Dev*, *PNAS*, *NAR*, etc.), but also by the number of invited talks at meetings (around 150).

The suppression of the four departments, the establishment of a scientific council and a committee of team leaders, the relocation in 2015 of all activities of the unit within one expanded building are all steps that improved internal collaborations, the sharing of expertise and mutual mentoring. These steps may also facilitate the continuous assessment of the scientific objectives of the whole unit and of their alignment with the central mission of the CNRS Institut des Sciences Biologiques (INSB).

The strong association with the Université of Strasbourg (Unistra), with 9 Professors, 16 Assistant Professors and 2 Emeritus Professors during the evaluation period as well as the implication of the unit in 2 Labex and in the



interdisciplinary federation of institutes IMCBio+, which provides the research framework for the Graduate School IMCBio, ensure a high level of integration into the local academic network.

Some efforts have been put also to ensure that the unit contributes to addressing societal issues, such as achieving sustainable crop production and producing virus-resistant grapevines.

### Weaknesses and risks linked to the context

The unit's implication in European or other international research programs is too limited (6 Marie Skłodowska Curie fellowships, 1 Human Frontier Science grant).

The unit is facing an increasing wave of retirements among its team leaders and, as already stated in the two previous evaluation reports, this situation provides an opportunity to reconsider the scientific objectives and portfolio of the unit rather than just to offer possibilities for internal promotion. This opportunity however appears poorly developed or formalized, despite a clear need to attract a new generation of team leaders from outside and to correct the persisting gender imbalance among PIs. Indeed, during the current evaluation period, only one (male) PI was recruited from outside, while two teams were closed and one was continued through internal promotion.

The explosion of big data puts an extraordinary pressure on the informatic/bioinformatic environment of the unit, which despite considerable efforts to improve and expand it, still suffers from understaffing (3 persons) and a lack of adequate resources.

The unit has suffered from the aftermath of a highly publicized case of scientific misconduct within a former team of exceptional international standing. This team was ultimately shut down.

### *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 4 departments have been abolished which may have improved communication and collaboration between the different teams and their staff.

The unit proposes a great program of HSE and ethic of science training with different tools to find a large public. The lab offers a new and efficient system for saving and archiving raw data.

It proposes different action to prevent environmental risk and to sustainably reduce greenhouse gas emissions over time.

Short thematic presentations are done every week.

### Weaknesses and risks linked to the context

Team retreat and monthly meeting seem to be reserved to team leaders, it would be interesting to extend scientific animation to all staff in particular with a regular scientific retreats.

Even if movement between teams seems possible, the staff transfer policy must be clarified.

Despite the disappearance of departments and a better collaboration between teams, there remain too few publications between teams. On 276 publications: 20 are join publications between several teams, 47 between teams and common facilities.

## EVALUATION AREA 2: ATTRACTIVENESS

### Assessment on the attractiveness of the unit

The vast majority of team leaders are regularly invited at national and international conferences and several members of the unit have participated in the organization of international congresses, or have been involved in editorial activities or in national or international evaluation committees. In addition to hosting 35-40 PhD students and 40-50 postdocs at anyone time, the unit has recruited two CNRS researchers, one Professor (as team leader) and two Assistant Professors. About 150 scientists, mostly from abroad, have also visited the institute to give seminars. The unit received about 60% of its funding, excluding salaries, through competitive grants, mainly national. It has also consolidated all of its existing facilities (eight in total) through the acquisition of new equipments.

However, the unique attributes and common visibility of the unit are not obvious resulting in a low number of scientists coming to work in the unit with their own funds. The attractiveness of the unit was assessed as very good while that of the teams ranges from very good to excellent.

## 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

The website is informative but could be improved to increase the attractiveness of the unit.

There are 16 teams in the unit and these vary in size (2-15 members, median 7). All have a solid scientific reputation but very small teams may be less attractive than the larger ones. All teams interact with researchers from all around the world. The many joint articles that have been published bear testimony to the success of these collaborations.

Most team leaders are regularly invited at national and international conferences (around 150 such invitations in total) and members of the unit have participated in the organization of about 30 international congresses.

Twenty members are involved in editorial activities in journals including high ranking journals such as *elife*, *Plant Cell*, *Plos Pathogen*, *Nucleic Acids Research* or more specialized but nevertheless excellent journals such as *Protoplasma*, *Molecular Plant Pathology*, *Phytochemistry*, *Plants*, *Plos One* and of course the more common *Frontiers journal (Frontiers in Plant Science)*. They have been also active in evaluation committees, national (ANR, Hcéres, CoNRS, IRD, CIRAD, etc.) and international (EMBO, FEBS, European foundations, Fulbright, Research Grant Council of Hong Kong, Barhein Golf University, etc.).

The unit hosts 35-40 PhD students and 40-50 postdocs at anyone time, or about 2 PhD students and 2-3 postdocs per team. It is actively involved in teaching and training activities, notably through the organization of regular external as well as internal seminars and of a one-day workshop that takes place each year in framework of the STRASRNA salon.

About 2/3 of the publications covered by the evaluation period have one PhD student as an author.

The unit has recruited two CNRS researchers one Professor (as team leader) and two Assistant Professors.

Over 100 scientists from abroad have visited the unit to give seminars.

One member was the recipient of a prize from the French Academy of Sciences and another member was elected at the Academia Europa.

The unit has attracted funding from a number of national and international sources (about 1.6-1.8M€/year or >60% of its annual budget): 6 Marie-Sklodowska-Curie actions (integration grants, post-doctoral fellowships, ITN), one ERA-NET COFUND action, various grants at the local levels, notably in the framework of the PIA (Labex, Idex) and 24 national grants (ANR: 17 PRC, 3JCJC, 2 PRCI, 2 LabCom).

The unit has exploited its unique position close to Germany and Switzerland to interact frequently with researchers from these two countries, notably in the framework of the Eucor (European Campus) program: a professor of the unit was the coordinator of the TRinational EuropEan Master of plant Sciences (2018-2020). Thus, the unit is a particularly active participant in the construction of a European network for scientific research and education.

The five core facilities (Genome expression analysis; Bioinformatics; Microscopy and cell imaging; Plant imaging and mass spectrometry; Protein expression and purification) and three technical facilities (Structural biology; Genome editing; Plant production) have all been the subject of new acquisitions in order to provide the best possible service to their many users within and outside of the unit. The unit notably acquired a scanning electron microscope that allows 3D imaging, a Solarix Maldi-Imaging spectrometer, both of which are unique in Strasbourg, a transmission electronic microscope and extra computer data storage space.

The five core facilities have all been recently certified by Cortecs, the scientific core facilities network of Unistra and the metabolomic facility received in addition the Iso 900 national certification from Ibisa. The Bioinformatics facility is linked to the regional BiGest infrastructure and as such it is part of the national infrastructure IFB (Institut Français de Bioinformatique).

### Weaknesses and risks linked to the context

The unit still suffers from a strong gender imbalance among its team leaders (4F, 12M).

Five team leaders will face compulsory retirement during or at the end of the next evaluation period.

New team leaders are predominantly recruited through internal promotion.

The number of European or other international grants does not appear commensurate with the size and scientific ambition of the unit.

The informatics/bioinformatics core facility suffers from a lack of sustained support, both financially and in terms of personnel.

The website could be improved to increase the attractiveness of the unit. There is little presence on social media. Hence, there is little evidence that the organisation uses current mechanisms/media opportunities to attract early stage researchers.

The unit is considered to be attractive largely because of its success and recognition gained through competitive funding calls. However, there is less evidence of success in translation or transfer of knowledge. Interactions with wider society remain limited in this respect.

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

### Strengths and possibilities linked to the context

Fifty PhD students defended their thesis during the evaluation period and 41 are currently enrolled in a PhD program within the UPR. Some of these doctoral students (13) are under contract with foreign universities. The committee notes excellent working conditions and a sustained effort to welcome PhD students and foreign researchers (welcome guide, training through one day workshop organized in frame of the graduate school). A very sustained effort is also given to the principles of honesty, scientific integrity and responsibility through a flyer and a complete guide named "integrity and responsibility in research practices" established by the CNRS entices committee (COMETS). Twice a year, the director gives a course on ethics and integrity and team leaders discuss integrity during the lab meeting.

In addition to the internal research training, PhD students benefit from training provided under the aegis of the doctoral school to which they belong. A budget of 1 000 € per student is reserved for travel to international conferences.

All doctoral students (91) have received funding during their thesis either in the form of a doctoral contract with the University of Strasbourg (51%) or foreign universities (8%), Cifre contracts (7%) or as part of co-financing with various organizations (33%, CNRS, Grand-Est Region). The PhDs trained in the UPR during the evaluation period are currently either civil servants (5), ATER (1), post-doctoral fellows in France or abroad (16) or on fixed or permanent contracts in the private sector (19). Nine are looking for a job, are studying again or are in an unknown situation.

On December 31, 2021, 34 members of the UPR hold an HDR, 13 of whom have defended their HDR thesis during the evaluation period.

Despite the pandemic period, over the period evaluated, the IBMP hosted 150 renowned guest researchers in the framework of existing or new collaborations.

### Weaknesses and risks linked to the context

The duration of most theses exceeds 36 months: the average duration of the 50 theses defended is 42 months and 23 theses lasted during 43 and 51 months.

## *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

The unit obtained 6 Marie Curie actions, one ITN, one ERA-NET COFUND action and one PI got an ERC 2014-2019 showing their relative success in European funding. At the moment of the evaluation no ERC was running in the Institute.

The unit was associated to 2 Labex in the frame of the UNISTRA Idex, MitoCross and NetRNA involving 6 IBMP teams.

Two Junior Chairs will be supported for the period 2021-2028 by these Labexes.

9 grants were obtained in the evaluation period for Labex calls: PhDs and Post-docs, Attractivity and Multidisciplinary). A serial block face microscope (600 keuros) was obtained.

Mutualized equipments were funded in the frame of CPER and GRAND EST region through CNRS support.

The Imaging Platform has been successful for several competitive calls of expensive equipment (3 major equipments in the review period). Improved interaction with the private sectors (2 labcoms) will diversify funding options for teams.

### Weaknesses and risks linked to the context

Ongoing funding on European grants is relatively limited (only one ERC that ended in 2019).

The evolution of Labex funding may become more focused on education and/or teaching innovation rather than pure research for Institutes not associated to Universities.  
 Mentoring young group leaders by experienced group leaders to have access to European and private funds may need to be improved.  
 Funding of platforms other than Imaging seems more difficult and may require a diversification of funding options.  
 Attractiveness of external new group leaders needs to be improved with a more active and focused recruitment strategy.

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

##### Strengths and possibilities linked to the context

In the IBMP there are 5 shared core facilities and 3 technological facilities which are very well equipped and have expert dedicated staff. They have got the university CORTEC certification.  
 Due to the investment of IBMP into the facilities, the access to the facilities is free for IBMP members which is an excellent situation for scientists.  
 A dedicated investment budget is taken from the unit's budget, which allows an ambitious investment policy to be implemented.  
 Through its membership to BigGest regional infrastructure, the bioinformatics facility is linked to national infrastructure (IFB).

##### Weaknesses and risks linked to the context

The policy of investment is not clear: especially the technological choices and priorities.

The instruments are more and more expensive to maintain, it could be interesting to work on the improvement of the sustainability of the facilities.

## EVALUATION AREA 3: SCIENTIFIC PRODUCTION

### Assessment on the scientific production of the unit

The IBMP has produced high-quality papers during the review period with over 50 publications per year, many of which were published in high level international journals such as *Nature Comm*, *Nature Plants*, *PNAS*, *NAR*, *Plant cell* (see below). Globally, the IBMP scientific output remains excellent as its production has matched high level international standards during the evaluated period. However there are disparities in scientific production between teams. Several major papers as main authors are from specific teams which lead to highly recognized international visibility. Others are collaborative where the specific expertise of the group leader was requested.

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

##### Strengths and possibilities linked to the context

More than 50 publications per year have been published during the evaluation period.  
 Several high-visibility papers have been published in *Nature Genetics* (1), *Nature Communications* (5 and 3 comments), *Nature Plants* (3) and *Plant Cell* (12), *PNAS* (2), *Developmental Cell* (1) and *NAR* (7).  
 Many of these high-visibility papers have a team leader or other researcher of the IBMP as corresponding/senior author, thus contributing to the international recognition of IBMP.  
 Young team leaders, despite their small teams, are highly productive and show potential to become major leaders in their fields.  
 Many collaborative papers in major journals testify to the expertise of IBMP researchers.  
 Attraction of young ERC-like candidates through the Idex Chair calls is an opportunity to expand IBMP research.

##### Weaknesses and risks linked to the context

Mentoring of young group leaders to increase the visibility of their publications to reach an ERC level is lacking.

Although plant sciences is usually at a disadvantage when it comes to this, there has been no publications by IBMP researchers in non-specialized journals of broad readership (*Nature/Science*) during the evaluation period. The use of the well-equipped core facilities (notably the imaging, genome editing, structural biology platforms) and of their staff to develop new research directions within and between teams appears under-exploited. Similarly, the use of the core facilities and their staff to develop interdisciplinary projects involving innovative methods (e.g. mathematical modelling, machine learning, advanced image analysis) is limited.

*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 UPR is excellent both in terms of quantity and quality. Over the period (2016-2021), the researchers (44) have published 353 articles (275 original papers and 78 review articles), i.e. nearly 60 original articles per year. All teams participate in this production as well as the PhD students (1.6 publications per PhD student). Teams 15, 6 and 14 are the biggest contributors with more than 30 publications over the mandated period. The teams all publish in very high-profile journals (2 and 54 publications respectively in very highly recognized journals). These journals are generally the best journals accessible to the plant biology community (*Nature Communication, Nature Plants, Plant Cell* and *PNAS*). Indeed, 38 publications have been highlighted by the CNRS-INSB on the website.

Weaknesses and risks linked to the context

IBMP scientific production has matched high level international standards in the mandated period, the only weakness is to the fact that no publications have reached the 2 or 3 top multidisciplinary journals such as *Nature, Science* or *Cell*.

*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

A big effort has been made to improve the integrity, ethic and open science. Training course on ethic and integrity are proposed twice a year to all new IBMP members by IBMP director, dedicated flyer (in French and English). Data sharing has been reorganized with dedicated place to store raw data accompanied with detailed declarative forms specifying the involvement of each author in carrying out the experiments, analyzing the results and assembling the figures.

Weaknesses and risks linked to the context

Awareness of scientific ethics among the teams must be maintained. The policy to improve open science is not completely clear, it would be interesting to edit some guideline for IBMP staff to share published data for instance i.e. data repository.

**EVALUATION AREA 4: CONTRIBUTION OF RESEARCH ACTIVITIES TO SOCIETY**

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

IBMP has improved its record in translational research which has become excellent. They have obtained 3 labcoms and a series of grants dealing with applied research. There is room to improve public outreach and their involvement in societal debates which are presently at a good level.

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

### Strengths and possibilities linked to the context

The unit comprises 16 teams and they each have different levels of interactions with non-academic players. Many teams interact with at least one company and have formed relationships to develop innovative products from their basic research findings. The SAD notes 10 public-private partnership projects and over the review period 60-70% of the unit budget was from external funding. A strength is the involvement in LabCom programmes, notably the Clean Stem project and GreenTolerance, and production of new high value products from plants, in TerpFactory with the Plant Advanced technology co. From the evidence in the SAD the teams have worked with non-academic stakeholders to focus on innovative scientific outputs from their research and most of the activities are at an early stage of technology readiness which is to be expected from a unit conducting fundamental research. From the SAD it is apparent that the teams are aware of the potential for commercial exploitation and in a few cases the IP from inventions has been protected, they are alert to opportunities. Some teams have fewer staff to pursue these opportunities and note they cannot do so because this would impact on basic science outputs.

### Weaknesses and risks linked to the context

Only a few teams were training PhD students or hosting engineers etc from the non-academic world and, as acknowledged in the Unit's own self-evaluation, there seems room for improvement in these activities. Many of the teams participate in annual science festivals or DECLICS, however, this could be considered dissemination of knowledge rather than citizens participating in research, it's not clear from the SAD whether there are projects that citizens actually participate in by, for example, co-constructing projects or gathering data. Several teams were investigating virus resistance using different biotech mechanisms (DRB proteins, nanobodies, cytoRP) for grapevine and sugar beet viruses which could have economic impact if successful. However, it was not clear if they were working together to share knowledge of the results of these different approaches or whether there was any work to pursue natural host resistance.

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

### Strengths and possibilities linked to the context

Once again there is variation in the activities of the 16 teams in this respect, with some teams (1, 2, 4, 10, 13, 14) having no or little activity. However, a number of teams have very strong activity in actively investigating new products. There are many excellent examples including mechanisms of virus resistance and the cleanstem project, Cifre project, new products from plants, RNA-based vaccines, the method of DNA sequencing direct from bacterial colonies, and the CNRS-Florimond-Desprez Commun.

Many team members of the unit actively contribute to professional networks and learned societies and are members of national and international expert committees and strengths include participation in FEBS and SFBBM committees, European H2020 activities and EMBO, Nobel panels and French Virology and phytopathology societies. However this concerns mostly academic research.

### Weaknesses and risks linked to the context

As acknowledged in the unit's self-evaluation the teams had few patents and startup companies, however, many teams did have relationships with industry and were on a trajectory to improve this situation.

A risk to the CleanStem project is the continuity of funding after the ANR LabCom funding ends.

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

### Strengths and possibilities linked to the context

All the teams but five participate at the yearly "Fête de la Science", some of them with specific events, like team 2, "Live genome sequencing" event twice during the period. In addition, team 6 is directly involved in the organization of the yearly "Journée des Plantes" through presentations of current and former Master students. There were large variations between teams in contribution to other outreach activities. Some members of the institute had significant contributions, like conferences towards the general public organized at the university of Strasbourg or communications on the CNRS website. Team 6 contributed to teaching articles for high school

biology teachers and one member of team 8 contributed to an article in the general public magazine "Science et Avenir"; team 6 provided some press releases and video communication and an interview to a national newspaper ("Journal du dimanche").

IBMP is strongly involved in awareness actions for school pupils, through researchers participation to outreach activities and/or visits in schools where they present their research and academic career, especially in the framework of the "Dialogue Entre Chercheurs et Lycéens pour les Intéresser à la Construction des Savoirs" (DECLICS) program.

## Weaknesses and risks linked to the context

The involvement of the IBMP in actions to share knowledge with the general public while significant remains limited.

It is the panel's belief that despite some activity in this the direction, the strong scientific expertise of the IBMP's researchers on current societal topics is not sufficiently called upon in the debates on plant biology themes that are of interest to the society.

## C – RECOMMENDATIONS TO THE UNIT

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

We recommend the unit improves proactively and collectively the definition of its scientific objectives. For instance, the Direction should help improve coordination of IBMP teams working on dsRNA. Given the large number of retirements the unit will face in the near future and because of the many technological and methodological advances in the life sciences in general over the past few years, which create numerous novel opportunities for plant molecular biology, the unit is in an ideal position to reconsider its scientific strategy.

The unit needs to decide which new scientific domains must be established and which ones should be maintained or reinforced, with a particular emphasis on young group leaders. This should be done on the basis of scientific excellence but also by considering future perspectives (e.g. interdisciplinarity, mathematical modelling, genome and epigenome editing, interactions with society such as outcomes of the climate change). The Unit should convene the SAB at regular intervals to help it in this endeavour, which will also impact the future development of platforms.

The unit should reinforce mentoring of young group leaders to reach an ERC-like status and encourage the recruitment of new group leaders (from France or outside) with the same goal.

Small teams should be helped to grow through dedicated mentoring as well through increased interactions with other group leaders.

Platforms should be more involved in the research activities of the teams so as they can be integral partners in the development of the new methodologies required to address scientific questions optimally (e.g. biosensors, modelling, single-cell analysis, spatial transcriptomics, high throughput transgenesis).

### *Recommendations regarding the Evaluation Area 2: Attractiveness*

The unit should define a clear and workable strategy for the replacement of the four team leaders that will face compulsory retirement within the next five years. This strategy should aim first and foremost to reduce significantly the gender imbalance. The Unit should strive also to recruit its new team leaders as much as possible from outside, notably through open calls and interaction with the Scientific Advisory board in order to define its recruitment strategy.

### *Recommendations regarding Evaluation Area 3: Scientific Production*

The scientific production is excellent but could be expanded further into new directions thanks to the broad and high level of expertise present in Strasbourg in different areas of the life sciences (e.g. structural Biology, mathematical modelling, RNA-based treatments, genome editing, evolution).

Mentoring of postdocs and young team leaders should be reinforced in order to help them make the most of their local environment to develop new and interdisciplinary approaches.

Mentoring of young group leaders to increase the visibility of their publications and reach an ERC-like level should be implemented.

Interactions between teams and team leaders should be encouraged further to favour complementarity and higher level publications.

Idex Chairs should be used to attract ERC-like candidates.

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

Possibly consideration could be given to support the non-academic activities, for example, appointment of a business development officer who could make contacts with industry or tighter interactions with the SATT.

More attention should be paid to outreach activities and public debates concerning the scientific issues where the IBMP is involved. The unit should be more proactive in that respect.



## TEAM-BY-TEAM ASSESSMENT

**Team 1:** Gibberellins and adaptation to environment  
 Name of the supervisor: Mr Patrick Achard

### THEMES OF THE TEAM

The team studies the contribution of plant hormones to different developmental and environmental processes in plants. The work essentially focuses in gibberellins a group of growth-promoting factors existing in plants. The system studied is essentially *Arabidopsis thaliana* and the group has analyzed the molecular mechanisms that contribute to gibberellin action in particular proteins of the DELLA group.

### CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

There were no specific recommendations in the previous report regarding this unit.

### WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
Professors and associate professors	0
Lecturer and associate lecturer	2
Senior scientist (Directeur de recherche, DR) and associate	1
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
<b>Subtotal permanent personnel in active employment</b>	<b>4</b>
Non-permanent teacher-researchers, researchers and associates	1
Non-permanent research supporting personnel (PAR)	0
Post-docs	1
PhD Students	4
<b>Subtotal non-permanent personnel</b>	<b>6</b>
<b>Total</b>	<b>10</b>

### EVALUATION

#### Overall assessment of the team

**Team 1 is a small team whose scientific production is excellent in quality (more than half in journals of exceptional reputation in its field). The team has supervised 3 theses and developed an excellent interaction with the non-academic sector through specific funding (Cifre PhD)**

## Strengths and possibilities linked to the context

The team set up in January 2012 addresses gibberellin (GA) transport and signalling with special focus on the role of DELLA proteins in plant including hormone transport and adaptation to adverse conditions. During the mandated period, the size of the team didn't change (1DR, 2MC, 1IE). This is a small, dynamic and productive team displaying an excellent publication record in term of quality. The mobilization of its expertise has led to original results. The team showed that in *Arabidopsis* the regulation of GA signaling is tissue-specific especially in the case of iron-deficiency responses and root-derived GA12 contributes to temperature-induced shoot growth. Work on nitrate signaling showed that plant growth upregulated GA biosynthesis and DELLA protein destabilization. In collaboration with Spanish collaborators, the team investigated the molecular mechanism underlying the activity of GAs in xylem fiber differentiation and showed that the function of GAs in the regulation of fiber development is regulated by the physical interaction DELLA-KNAT. The team research activities were supported by one ANR contract (PRC GROWTHDYNAMICS) obtained in 2017.

While dealing with a highly competitive field, the research performed by the team led to 11 publications during the mandated period, among which 5 reviews and 6 original articles as main contributor, published in highly ranked journals (*Dev Cell* 2016; *Development* 2018; *Nature Plants* 2019; *PLoS Pathol* 2019; *Curr Biol* 2021, *J Exp Bot* 2021). Finally, publication of five reviews testifies for the recognition of the group in the hormones research field (*Mol Plant* 2016, 2017; *Curr Opin Plant Biol* 2016; *Plant Signal Behaviour* 2016; *Nature Plants* 2017). The team's scientific output is closely linked to its size to ensure that priority is given to quality.

Three scientific productions have been highlighted by INSB-CNRS (GA put the iron in spinach!; When the roots speak to the leaves!; GA and nitrate, linked for growth).

The team research activities were supported by one ANR contract (PRC GROWTHDYNAMICS) obtained in 2017. The team leader has supervised four PhD students supported by three French ministry fellowships (for a 3-year PhD) and one private contract for a Cifre PhD. Three PhD are still in progress. The PhD student who passed his thesis has published 3 papers in excellent journals (*Mol Plant*, *Nat Plant* and *Curr Biol*) and all 3 as first author. This last one obtained in 2021 the Prize of Thesis of the Society of Biology of Strasbourg.

There are two HDR in the team, one HDR was defended during the evaluated period.

The team has established a partnership with the agrobiotech company Elicit Plant on plant adaptation to drought stress through phytoosterols, which allowed them to benefit from a doctoral contract of the Cifre type.

## Weaknesses and risks linked to the context

Scientific collaborations are not very visible. No participation or contribution to national or international networks or collective activities is mentioned.

No activity of organization of international symposiums or congresses is mentioned.

No article review activities have been mentioned in the report.

Interaction with social, economic and cultural environment is only at the good level and has further potential to be developed.

## RECOMMENDATIONS TO THE TEAM

The team's collaborations remain too limited. At the national level, the collaborations are quite weak and could be further developed. It is also necessary to better position the team in networks at the international level. The involvement in these networks should make it possible to improve the participation in the setting up and even the management of projects.

The committee asks that next time, a more sustained effort be made in the dossier, in particular on activities other than publications (organisation of symposia, congresses, reviewing activities, contribution to national and international conferences).

**Team 2:** Mechanisms of small RNA biogenesis and action  
 Name of the supervisor: Mr Todd Blevins

## THEMES OF THE TEAM

The team investigates the target specificity of RNA polymerase IV (Pol IV), its role in siRNA production and epigenetic signals that derive from this process.

## CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

One recommendation to the team had been to acquire external funding in order to increase the financial resources available to the team's research. With the acquisition of ANR and Labex NETRNA funding during the evaluation period, this point has been well addressed. The team has moreover commenced to expand its research to crops through its participation in the "CleanStem" project on grapevine, which involves a non-academic partner. Following further recommendations, the team has increased its public outreach activities through regular participation in the Fête de la Science and events hosted for schools. The goal to strengthen the team by increasing its number of permanent staff members had not been achieved at the time of submission of the SAD, but according to current information on the unit's web page, an assistant professor (MCU) has joined the team since then.

## WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
Professors and associate professors	0
Lecturer and associate lecturer	0
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
<b>Subtotal permanent personnel in active employment</b>	<b>2</b>
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	1
Post-docs	0
PhD Students	1
<b>Subtotal non-permanent personnel</b>	<b>2</b>
<b>Total</b>	<b>4</b>

## EVALUATION

### Overall assessment of the team

**The team has significant international recognition, and the discovery of a specific signature in pol IV required for genome surveillance is a major advance. The team has an excellent publication record and has outstanding prospects. The group has potential to reach an ERC-like status. It has also excellent interaction with the non-academic sector through specific funding on a grapevine project using nanopore sequencing although not dealing directly with the main theme of the team.**

### Strengths and possibilities linked to the context

The team dissected a novel protein domain in PolIV required for genome surveillance. They have also contributed in 3 major papers in collaboration with the previous postdoc laboratory of the PI. At IBMP, the team developed unique tools in Arabidopsis and now they are expanding them to Brachypodium. The evolutionary genomics approach in natural populations of this Mediterranean grass species may open wide perspectives and interdisciplinary interactions. The PI has an excellent network of international collaborators in this field but also several common projects with IBMP teams are emerging, notably one involving the private sector using nanopore technology.

### Weaknesses and risks linked to the context

The team needs to increase the number of permanent personnel (MdC or CR) to permit further diversification of the subject. Despite the detailed dissection of the enzyme using genetics and biochemistry, structural approaches may need further support from outside the Strasbourg Campus as it may lead to high impact publications. The field is very competitive in Arabidopsis and the Brachypodium project opens a nice diversification but requires interdisciplinary approaches (population genomics, evolution scientists).

## RECOMMENDATIONS TO THE TEAM

The team has potential to reach an ERC-like level and should be encouraged to take a leading role in the scientific life of the unit. The opening to Brachypodium combined with population genomics and evolutionary approaches is very promising. The interaction with the private sector on nanopore sequencing is interesting and diversifies the funding possibilities of the team. Support for structural biology from experts on the Campus may also serve to profit from the detailed dissection of this enzyme already achieved.

**Team 3:** Stress signaling to the nucleus  
 Name of the supervisor: Ms Marie-Edith Chabouté

## THEMES OF THE TEAM

This team is interested in the mechanisms of plant growth regulation to adapt to mechanical, biotic and abiotic stresses through signalling pathways transmitted to the nucleus. The objectives are to understand these pathways through interdisciplinary approaches (-omic tools, cell biology, physical technics, genetic and (epi)genomic) through the study of key players located at the nucleo-cytoplasmic interface. More specifically, the GIP proteins, regulators of microtubular networks and nuclear architecture in response to stress, are the key targets.

## CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

In the last evaluation (2018), the team had 3 recommendations. The first one was that the team should be more proactive to attract funding for PhD and Post doc. The second was that the team should increase the critical mass and the third was the need to develop outreach activities.

During this evaluation period, the team responded to all three recommendations. The team (3 scientists) has considerably improved the technical support through contractual (1 AI and 1 TR) and post-doctoral (1) staff and PhD student (3). The team established a strong and fruitful interdisciplinary collaborative network, notably through the different founding programmes (HFSP, ANR, INTERREG, France Relance, PHC) and research consortium (INDEPTH COST Action, GDRs EPIPLANT and PHYP) In the same time, the team has established partnership contracts with two different companies (Woodlight a start-up for bioluminescent plants and Soprema group implied in vegetated and green roof solutions).

## WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
Professors and associate professors	0
Lecturer and associate lecturer	1
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
<b>Subtotal permanent personnel in active employment</b>	<b>3</b>
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	2
Post-docs	1
PhD Students	1
<b>Subtotal non-permanent personnel</b>	<b>4</b>
<b>Total</b>	<b>7</b>

## EVALUATION

### Overall assessment of the team

**Despite tenured staff changes during the last period (retirements of 1 Associate-Professor and 1 Professor retired in 2019 and 2021 respectively, and departure of 1 researcher in 2019), team 3 brought very original and excellent results on the role of the nuclear envelope in perception of environmental stresses.**

### Strengths and possibilities linked to the context

The team has developed a highly topical research program in the field of mechanotransduction at the subcellular level and is recognized nationally (Idex award Mekanobio project supported by the CNRS), and internationally (HSFP awardee in 2018, webinar of the Society for experimental Botany) as pioneer in the field of nuclear mechanics in plants. The innovative contribution to the field of plant mechanobiology has been published (14 original articles and 8 reviews) in high ranking journals with a broad audience (*Current Biology*, *PNAS*, *Curr Opin in Plant Biol*, *Nature Plants*, *Int J Mol Sci*, *New Phytol*, *Plant Physiol*, *Plant J...*).

The international recognition of the team is apparent from co-publications with partners of the highest scientific level, in France (Olivier Hamant, Atef Asnacios, Michael Ryckelynck) and internationally (Henrik Jönsson, UK). In addition, the team is a member of several research consortia at the national and European levels (GDR PHYP since 2016; GDR EPIPLANT, since 2019; INDEPHT COST Action, 2017-2021).

The team obtained strong funding through national (ANR Mecha-NUC, CNRS INSB Diversity of biological mechanisms) and international (HSFP Integrating mechanotransduction in development) programs coordinated by the team's leader or one of the team's member.

The team develops a collaboration with a Tunisian research institute (Institut Supérieur de Biotechnologie de Sfax) that provides opportunities to hire students for doctoral fellowships and increase its publication capacity. Team's members are involved in scientific expertise committees (CNRS evaluation committee section 23, 2017-2021; ANR scientific committee CE13, since 2021).

The team's university staff has been very active in leading university cursus: one Professor of the team has been the coordinator of the Eucor TRinational EuropEan Master of Plant Sciences (2018-2020) to develop a common cursus for students from the Universities of Strasbourg, Basel, Freiburg im Breisgau, Haute Alsace and the Karlsruher Institut für Technologie; an associate-professor is responsible for the second year of the Master Course Plants, Molecular Biology and Biotechnologies.

The team has developed a public-private partnership with the firm SOPREMA since 2020 which is supported by the Strasbourg University Foundation since 2021 and by France-Relance FRESH-ROOT program since 2022, and WOODLIGHT a start-up involved in research and development of bioluminescent plants. The team is engaged in outreach activities and events towards the general and scholar public (participation at "Fête de la Science", "Journée porte ouverte", "Journée des Plantes", dedicated visits of pupils), it got involved in the Perspica-Cité IdeEx founded program (2018-2020) aiming to initiate a dialog between citizen and academic. In addition, one team's member is the IBMP Communicating Manager.

### Weaknesses and risks linked to the context

The team has undergone strong changes in its permanent researcher staff composition leading to a reduction in its size, which makes it fragile, especially due to retirements and a departure, it passed from 6 to 3 scientists (CNRS researchers and university associate professors and professors) between 2019 and 2022. The scientific theme the team decided to develop as a common scientific strategy adjusted to its task force, nuclear mechanotransduction, entails some high risks and most probably impacted its publication record for the evaluation period.

Although the team's results are published in journals of excellent level, its original result papers with a team's member appearing as last or corresponding author are not as numerous as expected from the interest of the topic (8 papers over the 6-year period), probably due to the importance of staff changes and focusing the team on a risky unified project. All the production seemingly rests solely on the shoulders of the team's leader. The team has supervised only three PhD students over the evaluation period, all by the team's leader.

The team as a whole is not really involved in student academic education except PhD supervision; the only university staff at the end of this evaluation period, an associate professor, appears quite lonely in the team for university teaching investment and the time he devoted to it is rather presented by the team as a waste of time for research.

## RECOMMENDATIONS TO THE TEAM

The team should increase its critical mass with additional tenure-staff (CNRS researcher or University Professor) in order to secure its excellent basic research activity and capacity to attract competitive funds while developing the promising partnerships with private companies they initiate during the evaluation period. The team must maintain, or possibly increase a bit, its attractiveness for PhD students and post-doc fellows.

We recommend progressively moving away from the descriptive nature of the phenomena to a deeper understanding of molecular mechanisms underlying nuclear dynamics.

**Team 4:** Metabolism and trafficking of RNA  
 Name of the supervisor: Ms Laurence Drouard and Ms Anne-Marie Duchêne

## THEMES OF THE TEAM

The paperwork was not helpful in finding the objectives of the team. The team addresses the following research questions: What are the tRNA cleavage pathways in the plant cell and what are the roles played by the small non-coding RNAs generated by these cleavages? How extensive is the process of targeting cytosolic mRNAs to the surface of mitochondria, how is the translation of organelle-associated mRNAs organized and regulated in the plant cell? What cis and trans elements are involved in mitochondrial translation? This work is carried out within the framework of the laboratory of excellence (Labex) MitoCross.

## CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The team had been recommended to increase publication activity. This has been addressed during the evaluation period, resulting in an excellent publication record.

## WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
Professors and associate professors	1
Lecturer and associate lecturer	1
Senior scientist (Directeur de recherche, DR) and associate	1
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
<b>Subtotal permanent personnel in active employment</b>	<b>4</b>
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	2
Post-docs	0
PhD Students	4
<b>Subtotal non-permanent personnel</b>	<b>6</b>
<b>Total</b>	<b>10</b>

## EVALUATION

### Overall assessment of the team

The team has long been an international leader in its fields of expertise, i.e. tRNA metabolism and the molecular biology of mitochondria in the model alga *Chlamydomonas reinhardtii*. Emphasis is put on fundamental research. The team has recently developed new national and international collaborations in order to extend the team's portfolio to fast-advancing approaches such as structural analyses and NGS, leading to an excellent output of research findings and publications. The attractiveness and research dissemination activities are rated very good to excellent.



## Strengths and possibilities linked to the context

During the evaluation period, the team has confirmed its leading role in the fields of i) tRNA metabolism and ii) molecular biology of mitochondria in the model alga *Chlamydomonas reinhardtii*, as evidenced by an excellent publication record. The team published 19 peer-reviewed research articles, 10 of them with one of the two team leaders as corresponding author. 4 of these publications appeared in very high-quality journals such as *Nature Communications* and *Nucleic Acids Research*. Among the 9 co-authored original publications are two in *Nucleic Acids Research* and *Current Biology*. In addition, the team (co-) authored 3 book chapters. One team leader, jointly with the team leader of E08, edited 2 special issues, one on tRNA biology and one on RNA biology in plant organelles.

The team succeeded in securing substantial external funding through 3 ANR grants and Labex funding. Two consecutive funding periods for the Labex MITOCROSS consortium, which the team is part of, have awarded long-term support to the group. Approval of a second Labex MITOCROSS funding period has validated the success of the first period of funding. Additional financial resources have been obtained through 1 Idex fellowship and 1 regional post-doctoral fellowship.

Research carried out by the team benefits from a network comprising in-house (the team has jointly published with four other IBMP teams: E03, E08, E09, E015), national as well as international collaborators. Many of these collaborations have resulted in very high-impact publications (e.g., Waltz et al 2022, Warren et al 2021, Montgomery et al 2020). The team's research contribution to their area of expertise is internationally recognised. Several members of the team have been invited to present their research at international congresses or other research institutes (16 invited presentations or seminars). One team leader has been involved in the organisation of 1 national and 2 international conferences and has acted as a member of several scientific expert or selection committees.

The team has contributed to the training of young scientists, with 3 PhDs completed during the evaluation period. All students who completed their PhD during the evaluation period had published an original research article as first author by the end of the evaluation period. Both team leaders are involved in the administration of the IMCBio Master and graduate student programme, and one team leader teaches as a university professor. This is an advantage for the recruitment of Master and PhD students to the team.

Members of the team have repeatedly engaged in general outreach activities, such as the "Fête de la Science". Moreover, they participated in the organisation of outreach and training events for young people (OpenLAB and others).

## Weaknesses and risks linked to the context

Owing to their engagements in the direction of the institute and in teaching, the two team leaders have only limited time they can dedicate to research and research supervision. While the team has actively published in the field of tRNA biology, the challenging research on RNA trafficking has produced comparatively less output. The team will struggle to maintain its competitiveness unless it can grow in size and secure better funding streams.

With only 3 permanent staff members at the moment, two of whom are occupied with duties other than research during 80% of their time, the team is rather small for the competitive and broad research programme it engages in.

Despite successful international collaborations of the team, its leaders have not succeeded in obtaining funding through international consortia or in taking the lead in such consortia.

## RECOMMENDATIONS TO THE TEAM

The team should aim at attracting additional permanent staff (at the minimum one technician) in order to support its competitive and successful research programme. While the team has regularly recruited and trained PhD students, efforts could be made to also attract postdoctoral researchers supported by their own funding. The team could use their network to become part of international research consortia, which provide an additional source of funding.

The team should develop a strategic plan for recruitment. For example, is it possible to bring in new team members on ERC or similar grants.

The previous research activities have been too dispersed and would benefit from better integration to remain competitive.

**Team 5:** RNA degradation  
 Name of the supervisor: Mr Dominique Gagliardi

## THEMES OF THE TEAM

The team works on the characterization of RNA degradation in plants: they study pathways and impact of this degradation in the regulation of gene expression, and particularly its implication on benefits for human health and food security.

## CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The previous committee suggested to produce a more general review in plant journal. Publication of the team is still of an excellent level and the majority of publications of the team (11) were published in plant journal, but quite few reviews were done.

## WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
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	3
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	1
<b>Subtotal permanent personnel in active employment</b>	<b>5</b>
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	0
Post-docs	0
PhD Students	4
<b>Subtotal non-permanent personnel</b>	<b>4</b>
<b>Total</b>	<b>9</b>

## EVALUATION

### Overall assessment of the team

**The team has reached an excellent to outstanding standard on an interesting and original subject. They have been publishing regularly in international journals, both in the plant field and in multidisciplinary journals. They have also succeeded in getting funds from ANR.**

## Strengths and possibilities linked to the context

The strengths of the team are based in its experience in an original field and in a network of international collaborations. Their work uses a combination of proteomic and novel sequencing techniques that allow them to have novel insights in the question they study. Team succeeds in getting regularly funds from ANR. The team is composed of 4 permanent researchers and is well adapted to the IBMP environment. The group has been regularly publishing articles in multidisciplinary journals and in plant journals.

## Weaknesses and risks linked to the context

Insufficient emphasis has been put on finding the biological relevance of the highly original mechanisms discovered by the team.

## RECOMMENDATIONS TO THE TEAM

The team has an excellent experience in analysing the molecular modifications present in RNA that modulate its degradation. As in the previous report, the team is encouraged to put more effort in finding the biological relevance of molecular processes under study and tie them to specific contexts, such as seed development and viral infection processes. We highly recommend that the team leader applies to the ERC.

**Team 6:** Evolution and diversity of plant metabolism

Name of the supervisor: Mr Emmanuel Gaquerel

## THEMES OF THE TEAM

The objective of the team is to elucidate the evolutionary and biochemical determinants of plant metabolic diversity, with particular interest in pathways leading to specialized metabolites, the underlying jasmonate regulators as well as apoplastic biopolymers forming a major fraction of plant biomass.

The team's strategy is to identify and characterize key genes (in particular from the cytochrome P450 superfamily) and to reconstruct metabolic pathways using a wide range of plant models among dicots, monocots, and moss. More specifically this concerns the synthesis of hormones (jasmonates), structural biopolymers (phenolic and fatty acid biopolymers) and various specialized metabolites.

## CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

In the past evaluation report (2018), no major weakness has been notified. Some recommendations have been expressed concerning the fact that a large part of the output was relying on the team leader. The committee asked the next generation of scientists to take over to maintain the scientific excellence of the team. The recruitment of a young and talented professor has resolved the question of the team leadership and the stability of the team. In the light of the present scientific production, the job has been done.

The second recommendation was to identify topics that would allow a long-term collaboration with companies. The team expertise on the biochemical dissection and engineering of high-value metabolic pathways has resulted in several public-private partnerships (Lesaffre a company specialised in yeast production and a biotech start-up Lantana Bio) and also through a ANR LabCom named TerpFactory with the Plant Advanced Technology company. In this case, the team's metabolic engineering expertise has been used to produce high-value plant derived anti-inflammatory terpene compounds.

## WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
Professors and associate professors	1
Lecturer and associate lecturer	2
Senior scientist (Directeur de recherche, DR) and associate	1
Scientist (Chargé de recherche, CR) and associate	3
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	1
<b>Subtotal permanent personnel in active employment</b>	<b>8</b>
Non-permanent teacher-researchers, researchers and associates	3
Non-permanent research supporting personnel (PAR)	1
Post-docs	0
PhD Students	5
<b>Subtotal non-permanent personnel</b>	<b>9</b>
<b>Total</b>	<b>17</b>

## EVALUATION

### Overall assessment of the team

**The team has an excellent level of scientific production, particularly with respect to the use of multi-disciplinary and multi-model approaches to explore plant metabolic adaptations. Recent recruitments within the team has included much-needed new expertise in evolutionary functional genomics, metabolon characterization and metabolomics. The team has a cohesive research focus comprising of four main interconnected research projects that build on shared methodologies and common gene families.**

### Strengths and possibilities linked to the context

The team has a strong research profile together with internationally recognized expertise in metabolic pathways and associated biochemistry. Three permanent researchers (as well as a CNRS technician) have joined the team during the reporting period, bringing in novel expertise. Hence, the strength and capacity of the team has been strongly reinforced and research objectives have been more clearly emphasised. Synergies must be further increased to ensure that the unique combination of team expertise is fully utilised.

### Weaknesses and risks linked to the context

Efforts to ensure cohesion of research focus and direction have not yet resulted in an entirely satisfactory status. There is currently a high ratio of permanent-to-junior scientists. This ratio should be improved with a focus on diversification of recruitment funding schemes.

## RECOMMENDATIONS TO THE TEAM

The approach on evolutionary and comparative biochemistry is encouraged.

The further integration of the team is also encouraged.

The excellent team management policies of the PI are encouraged.

**Team 7:** Role of ubiquitin in cellular regulations

Name of the supervisor: Mr Pascal Genschik

## THEMES OF THE TEAM

The team studies the regulation of plant protein stability and activity by ubiquitylation, with impacts on cell division, hormone signalling and gene expression regulation during stress.

## CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Not applicable (no recommendations).

## WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
Professors and associate professors	0
Lecturer and associate lecturer	2
Senior scientist (Directeur de recherche, DR) and associate	1
Scientist (Chargé de recherche, CR) and associate	2
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	1
<b>Subtotal permanent personnel in active employment</b>	<b>6</b>
Non-permanent teacher-researchers, researchers and associates	1
Non-permanent research supporting personnel (PAR)	0
Post-docs	1
PhD Students	4
<b>Subtotal non-permanent personnel</b>	<b>6</b>
<b>Total</b>	<b>12</b>

## EVALUATION

### Overall assessment of the team

**This is an outstanding team and the PI is a world leader in the field of protein degradation in plants. The quality of the publications produced as well as the ability to attract funding (one ERC AdG obtained during the past evaluation period that ran until 2020) are both excellent to outstanding. International competition with other groups in the field of RNA silencing and autophagy is fierce however.**

### Strengths and possibilities linked to the context

The team is composed of 1 PI and 5 other permanent members (2 CRCN CNRS, 2 MCU and 1 IR CNRS). It hosted 7 postdocs and 4 PhD students during the evaluation period, which attests to a high level of attractiveness. The scientific production is proportionate to the research potential of the team and shared out between its

personnel. Indeed, the team published during the evaluation period 12 research papers, all of which are of high quality (*NAR*, *Plant Cell*, *New Phytol*, *Plant Physiol*, *PNAS*), and 7 reviews. All team members except the ones who joined the team recently are co-authors of at least one research paper.

Although the team carries out mainly fundamental research, it has recently been involved with two other teams of the unit in a collaboration (through the ANR LabCom program) with the private company Mercier, a world leader in grape vine production and in vineyards creation. A long-term goal is to make grape vines more resistant to several major viruses such as ArMV and GFLV. Moreover, 4 former team members now work in companies in France and abroad.

The team leader participates in different international expertise activities. He was notably a member of the EMBO YIP committee (2019-2021) and of several European panels, where he often acted as vice chair H2020-MSCA-ITN-2016 & 2017 & 2018 & 2019 & 2020; H2020-MSCA-IF-2017 & 2018; H2020-SFS-BG-RUR-2018.

### Weaknesses and risks linked to the context

The team is not funded anymore by the ERC, which will inevitably impact its productivity and may threaten its competitive edge in a crowded and fast moving field of research.

## RECOMMENDATIONS TO THE TEAM

The panel encourages the PI to apply for an Advanced or Synergy ERC grant as soon as possible and take this opportunity to ask for a super resolution microscope to reinforce the cell biology dimension of the many mechanisms of protein (and RNA) degradation the team has discovered. The team should better coordinate with other IBMP teams working on dsRNA.

**Team 8:** Functions of PPR proteins

Name of the supervisor: Mr Philippe Giegé

## THEMES OF THE TEAM

Research performed by the team is focusing on the PPR domain-containing protein-only RNase P (PRORP) enzymes and on the PPR protein-containing plant mitochondrial ribosome.

## CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

All recommendations previously given to the team have been complied with: An additional team member obtained his HDR. The team has established contacts with companies in order to explore possibilities for using a modified RNase P for the generation of plants that are resistant to viruses. A related patent held by the team has been extended to the international level during the evaluation period. In addition, the team has participated in various outreach activities, including "Fête de la Science", the organisation of regular lectures given to the general public, and activities organised for schools.

## WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
Professors and associate professors	0
Lecturer and associate lecturer	0
Senior scientist (Directeur de recherche, DR) and associate	2
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)	2
<b>Subtotal permanent personnel in active employment</b>	<b>4</b>
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	0
Post-docs	0
PhD Students	5
<b>Subtotal non-permanent personnel</b>	<b>5</b>
<b>Total</b>	<b>9</b>

## EVALUATION

### Overall assessment of the team

**Team 8 is a small team (1 tenure-researcher and 2 engineers), whose scientific production is excellent to outstanding in quality (original articles and reviews in excellent journals). It has an impressive activity in developing collaboration with other teams in the institute and internationally, participating to international congresses and developing outreach events. It has an excellent attractivity overall and displays very good socio-economic integration.**



## Strengths and possibilities linked to the context

The team has recently made scientific breakthroughs in the areas of mitochondrial ribosomes biochemical characteristics, function and the biotechnological applications of protein-only RNase P enzymes (PRORP). These advances have been recognized internationally as apparent from 4 publications in *Nature Plants* and *Nature Communication* and 1 review in *Current Opinion in Plant Biology* since 2019. Considering its small size, with only two permanent researchers (one at the end of the evaluation period), the team has an impressive list of outstanding publications over the evaluation period. Among the 8 original papers and 4 review papers with last/corresponding authorship by team members (upon the 10 and 8, respectively, to which they have participated), it is worth to mention 2 *Nature Communications*, 2 *Nature Plants*, 1 *Journal of Biochemical Chemistry*, 1 *Trends in Biochemical Sciences*, 1 *Biomolecules* and 2 *Plant Journal*.

The team has developed several collaborations with other groups in the institute as apparent from 3 co-publications with team 4, and 2 with team 5.

The team has developed products for the socio-economic world, as a result of their technological project that succeeded in re-localizing plant-protein-only RNase P in the cytosol (CytoRP) to target plant viruses tRNA-like structures. The team made experimental proof of concept in *Arabidopsis*, and it obtained the international extension of a European patent, and cross-visits between team's members and delegates of crop breeding companies (Rijk Zwaan, Enza Zaden) prepare applications of their finding.

The team international recognition is apparent from the organization and co-chair of a large international meeting ("27<sup>th</sup> international tRNA conference" (Strasbourg, 2019, 300 researchers from 29 countries). The team's leader but also PhD student and post-doctoral fellows have been invited in 7 international congresses and 3 foreign universities for seminars since 2016 all around the world (Korea, Japan, China, Australia, Israel, Germany, Italy, France).

The team's members take part in public outreach activities and events (yearly "Fête de la Science", contribution to an article in general public magazine "Sciences et Avenir", IBMP correspondent member at the French society of biochemistry and molecular biology (SFBBM) that organized a series of conferences at IBMP, animation of school visits at IBMP, involvement in the DECLICS program towards school pupils).

The team's leader has participated to several research steering or evaluation committees (elected member of CNRS committee, section 23, 2016-2021; panel member for 3 Hcéres research unit committees, 2017, 2018, 2020; jury president for CNRS-section 23 Research Director competition, 2021). The team's leader is much involved in the research unit management, since he is one of the two deputy-directors of IBMP.

## Weaknesses and risks linked to the context

The team's projects are highly risky, especially because they are based on structural biology approaches (X-ray crystallography, single particle cryo-electron microscopy), which are intrinsically hazardous. The PRORP proteins and mitoribosome research fields are extremely competitive, with world leader laboratories in Europe, USA, Japan and Australia, and the team has a small task force and funding support compared to its competitors.

Although the team co-publish with scientists of other French and European laboratories, it did not develop strong international scientific partnerships through participation at recognized research network or scientific institutions. The team has a very limited number of scientific supervisors since at the end of the evaluation period, the team's leader is the team's unique permanent researcher.

Only two members of the team, including the team's leader, who, in addition, bears several responsibilities, have the accreditation to direct doctoral theses which may hamper research activity of the team.

The team developed no significant higher educational activity beside PhD student supervision.

## RECOMMENDATIONS TO THE TEAM

To ensure its future viability, the team should be reinforced by the recruitment of a young permanent scientist (Chargé de recherche or Maître de conférences). Furthermore, the team's leader has the calibre to obtain an ERC grant and we encourage him to keep applying, with a reinforced team. The team has developed a network of internationally recognized researchers and, considering the multidisciplinary essence of its research, it is strongly recommended to maintain these collaborations as active as they are currently. With regards to the development of products for the socio-economic world, the team should strengthen its interactions with companies so that the technology they developed to induce plant resistance to virus be actually applied to commercialized crops. These partnerships should lead to personnel exchanges (non-academic personnel hosted in the team, PhD or contractual young scientists financed by a company, hosting team's PhD in the private company, etc).

**Team 9:** Maintenance and segregation of the mitochondrial genome  
 Name of the supervisor: Mr José-Manuel Gualberto

## THEMES OF THE TEAM

The team investigates the maintenance, segregation and repair of the plant mitochondrial genome, and has recently expanded research activities to investigate retrograde and anterograde regulation processes connecting the endosymbiont-derived organelles (plastids, mitochondria) with the nucleus. The team has developed robust experimental protocols and tools for the analysis of plant mitochondrial genome recombination and repair in Arabidopsis. These studies extend to crop species.

## CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

There had been no recommendations to the team.

## WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
Professors and associate professors	0
Lecturer and associate lecturer	1
Senior scientist (Directeur de recherche, DR) and associate	1
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)	0
<b>Subtotal permanent personnel in active employment</b>	<b>2</b>
Non-permanent teacher-researchers, researchers and associates	1
Non-permanent research supporting personnel (PAR)	1
Post-docs	0
PhD Students	2
<b>Subtotal non-permanent personnel</b>	<b>4</b>
<b>Total</b>	<b>6</b>

## EVALUATION

### Overall assessment of the team

The team is an international leader in the area of mitochondrial genome maintenance and has identified and characterised a considerable number of factors that participate in or influence the processes of recombination and segregation of the plant mtDNA. They have innovatively used TALEN endonucleases targeted to mitochondria to study the repair of specific breaks in the mtDNA and as tools for mitochondrial genome editing with very good prospects of translational research. Despite the decrease of the size of the team during the evaluation period, owing to the retirement of a team co-leader, the team has maintained very good attractiveness supported by Labex and ANR funding and very good to excellent research and publication activities.

## Strengths and possibilities linked to the context

The team is an international leader in the field of plant mitochondrial genome (mtDNA) maintenance. The majority of newly discovered factors involved in plant mtDNA maintenance have first been described by this group. Research findings by the group have led to a very good publication record during the evaluation period, with 11 original articles, 3 reviews and 1 book chapter. For 4 original articles, 2 reviews and the book chapter, a team member is corresponding author. One of the review articles is an invited contribution to the prestigious Annual Reviews in *Plant Biology* (Newton and Gualberto, 2017). 1 original publication with first and last authors from the team is based on an ANR-funded collaboration with a breeding company. The team leader edited a special issue on DNA damage repair in plants. The team has made an important contribution to the present knowledge on the structure and evolution of plant organellar genomes.

The team succeeded in securing external funding through 1 ANR grant and Labex funding. Two consecutive funding periods for the Labex MITOCROSS consortium, which the team is part of, have awarded long-term support to the group. Approval of a second Labex MITOCROSS funding period has validated the success of the first period of funding.

Research carried out by the team benefits from a network comprising national as well as international collaborators. 3 of these collaborations have resulted in very high-impact publications (e.g., Flood et al 2020, Paszkiewicz et al 2017, Sultan et al 2017). Several members of the team have been invited to present their research at international congresses or other research institutes (22 invited presentations or seminars). The team leader has acted as a member of several scientific expert or selection committees at a local or national level.

The team has contributed to the training of young scientists, with 5 PhDs completed during the evaluation period. 3 students who completed their PhD during the evaluation period had published an original research article, 1 had published a book chapter as first author by the end of the evaluation period.

Members of the team have repeatedly engaged in general outreach activities, such as the "Fête de la Science" and events hosted for schools. Non-academic interactions of the team have been promoted through collaboration with a breeding company.

## Weaknesses and risks linked to the context

Owing to the smallness of the research field and hence the scarcity of contributions by other researchers at the international level, research progress in the field is slow. This also affects the output of the research team, with the number of original articles published during the evaluation period limited to 4. None of these were published in the top journals. The team's work on regulatory processes connecting plastids and mitochondria with the nucleus may take away resources from the core area of expertise of the team.

Despite successful international collaborations of the team, they have not succeeded in obtaining funding through international consortia or in taking the lead in such consortia. Neither have they attracted international researchers bringing their own funding.

It has not been possible for the team to increase its workforce and permanently recruit young scientists into its research programme. It is therefore likely that the research theme cannot be maintained by the unit, following the retirement of the present team leader.

Not all PhD students who completed their PhD during the evaluation period succeeded in publishing their work as first authors of original research articles, though this will still happen according to the SAD.

The team has not been able to obtain funding to continue its collaboration with non-academic entities.

## RECOMMENDATIONS TO THE TEAM

The team is encouraged to focus its research activities on mitochondrial genome maintenance and stability, which are unique at the international level, and if possible even intensify those activities. The team should aim for publication of original work in high-quality journals, in order to not "undersell" research outputs, while maintaining their strategy to ensure first-author publications by PhD students by the end of their PhD.

**Team 10:** Chloroplast genetic adaptation

Name of the supervisor: Mr Kamel Hammani#T10

## THEMES OF THE TEAM

The team works in the field of gene expression regulatory process in chloroplast with a special focus on chloroplast RNA binding proteins and posttranslational modifications.

The team was started in 2017 to address fundamental questions concerning chloroplast gene expression and RNA regulation. They collaborate extensively with specialists in this field. All projects carried by the team have been funded by ANR or European research programs. The results have been published in high-profile journals.

The team launched an interdisciplinary project on the engineering of programmable RNA binding proteins with teams from INRAE and INSERM with the aim of delivering new methods to facilitate hybrid seed production in plants and protein therapeutics for human RNA-dominant diseases.

The team has also established collaborations with CNRS biophysicists from TIMC-IMAG (Grenoble), L2C (Montpellier) and LAAS (Toulouse) laboratories.

## CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

For the previous assessment the team was very young so no recommendations had been done.

## WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
Professors and associate professors	0
Lecturer and associate lecturer	0
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)	0
<b>Subtotal permanent personnel in active employment</b>	<b>1</b>
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	0
Post-docs	2
PhD Students	2
<b>Subtotal non-permanent personnel</b>	<b>4</b>
<b>Total</b>	<b>5</b>

## EVALUATION

### Overall assessment of the team

**This new team has a very good level of increasing high quality publications. The research topics are engaging with excellent prospects. It is proactive in securing research funding and has a strong record of international collaborations.**

## Strengths and possibilities linked to the context

The team is competitive and dynamic and has secured both national and international funding since its creation in 2017. The team leader applied to the ERC CoG 2022 call and is proactive in obtaining funding. The PI is internationally recognized in the field of chloroplast gene expression. This team has attracted postdocs funded from the European MSCA Horizon program. This research team has significant potential to grow as the research themes develop.

## Weaknesses and risks linked to the context

There are no major weaknesses in this team. While still small in size the team is making significant impact and the team leader is proactive in attracting research income.

## RECOMMENDATIONS TO THE TEAM

This team should continue its efforts to grow and the support from the unit will be critical in this respect. The team has the potential to become a major player within the unit in the future.

**Team 11:** Plant-virus interactions during viral cell-to cell movement

Name of the supervisor: Mr Manfred Heinlein

## THEMES OF THE TEAM

The team investigates the molecular and cellular mechanisms involved in virus cell-to-cell movement and intercellular communication through plasmodesmata. During the evaluation period, the team addressed the role of small RNAs in this cell-to-cell movement and also showed that dsRNAs, produced during viral replication or applied externally, acts as signals in plant antiviral defense. In addition, the team carried out translational research and created notably novel bioprotective agents against virus infection.

## CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The two recommendations made in the previous evaluation were to engage in a necessary strategic reflection to reduce the number of research directions given the very reduced size of the team and to find a way to associate a permanent staff member with this excellent team leader to provide continuity in the future. These two recommendations do not appear to have been addressed.

## WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
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	0
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	0
<b>Subtotal permanent personnel in active employment</b>	<b>1</b>
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	0
Post-docs	4
PhD Students	1
<b>Subtotal non-permanent personnel</b>	<b>5</b>
<b>Total</b>	<b>6</b>

## EVALUATION

### Overall assessment of the team

**This is a small but highly productive team with strong international collaborations. The team has produced novel and innovative findings with an excellent scientific publication record and has attracted a high level of external funding.**

## Strengths and possibilities linked to the context

The team leader is internationally renowned for his research in plant virology, mainly focussing on virus movement and intercellular communication. The team is relatively small but in the review period they have made several important findings that have had impact in advancing basic knowledge as well as looking at ways to exploit the findings for commercial use. For example, understanding the role of dsRNA molecules in anti-viral immunity (they are perceived as PAMPS inducing PTI responses) revealing a distinct anti-viral defence pathway operating differently from RNA silencing. There were new findings on the mechanism of tolerance to viruses, and the use of dsRNA as a means of virus control where they demonstrated that spraying dsRNA (produced at scale in bacterial system) onto infected leaves was a feasible method and which may lead to a new (non-GMO) method for crop protection, the team also attracted funding for an ERA-NET project 'Bioprotect'.

The team's bionanotechnology work with TMV either as virions or nanoparticles derived from CP subunits have demonstrated much potential for use in human healthcare. TMV virions have also been engineered for improved in vivo imaging in plant cells.

The team have published 20 important high-quality papers during the review period often with international collaborators.

## Weaknesses and risks linked to the context

This is a very small team (headed by one senior scientist) and this must limit the research that can be done. Much of the research was done with international collaborators and while this is very good, the team could be encouraged to look for more ways to collaborate and share ideas internally with unit colleagues. Particularly the work on bio-nanotechnology and virus control seems of common interest to several teams and perhaps such collaboration might help provide additional resources.

## RECOMMENDATIONS TO THE TEAM

Look for more ways to collaborate and share ideas internally with unit colleagues.  
The team should better coordinate with other IBMP teams working on dsRNAs.

**Team 12:** Biology and Biotechnology of grapevine viruses  
 Name of the supervisor: Mr Christophe Ritzenthaler

## THEMES OF THE TEAM

The team shifted its focus from fundamental aspects of grapevine viruses biology, transmission and spreading in the plant to nanobody, VLP and dsRNA technologies. This leads the creation of the Labcom CleanStem (aiming at producing virus resistant grapevine), coordinated by the team's leader, that federates 3 teams at IBMP together with an industrial partner (Mercier company, a vine nursery international expert). In addition, the team delivered several products to socio-economic world and established other non-academic interactions (maturation programs with SATT and CNRS, spin-off project Serendip innovation hosted at IBMP for the development of therapeutic vaccines).

## CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The previous report recommendation to increase the total number of publications has not been implemented in full: over this 6-year evaluation period the team produced 10 articles and prioritised leading international peer reviewed journals, among which 7 as first and/or last author.

## WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
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	0
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	1
<b>Subtotal permanent personnel in active employment</b>	<b>2</b>
Non-permanent teacher-researchers, researchers and associates	2
Non-permanent research supporting personnel (PAR)	0
Post-docs	0
PhD Students	1
<b>Subtotal non-permanent personnel</b>	<b>3</b>
<b>Total</b>	<b>5</b>

## EVALUATION

### Overall assessment of the team

**This team has highly productive and excellent outputs. The team conduct research from fundamental discovery science to application. It is supported by a high level of external funding and has outstanding links to industry.**



## Strengths and possibilities linked to the context

In the review period, the team has published several high impact papers, for example, cryo-EM studies of GFLV-Nb to understand the structural basis of nanobody recognition of GFLV and its resistance-breaking variants, and identification of key amino acids that play a role in nematode transmission. They also developed a new method to detect dsRNA *in vitro* and *in vivo* that can be used to detect intermediate replicative forms of a broad range of +sense RNA viruses. They have developed virus-like particles that display fusion proteins on the inner or outer surface of the VLPs which can be expressed as nucleic acid-free VLPs in plants.

The team conducts internationally leading research collaborating with members of other teams in the unit as well as national and international experts.

The team have very successfully translated the findings of some of this research into products for commercial use. They have attracted ANR grants working with other teams in the unit e.g. Clean Stem. This team certainly demonstrates that findings from fundamental science can be translated to useful products for society.

## Weaknesses and risks linked to the context

The size of the group seems to be a limiting factor for further development

## RECOMMENDATIONS TO THE TEAM

Given the success of the nanobody approach the team should consider application to other virus diseases of importance.

The team should find the means to increase its human resources to maintain an optimal balance between basic and translational research.

The team should better coordinate with other IBMP teams working on dsRNA.

**Team 13:** TOR signaling control in plant translation

Name of the supervisor: Ms Lyubov Ryabova

## THEMES OF THE TEAM

The team works on the role of the TOR kinase signalling pathway in translation, viral infection, growth and morphogenesis in plants but also has expanded its research into applications in Biotech both in humans (cancer) and plants.

## CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

A previous recommendation was to increase the number of papers and that the MdC was not authoring any paper. During the last mandate the team published in *PLoS One* in 2017 and in *Nucleic Acid R.* on RNA export in CaMV in 2021 as a corresponding author. The team has been reduced significantly in up to only the PI and two PostDocs in 2021: IE CNRS retired (December 2020), Professor UDS joined the virology group (January 2021), CR1 left in January 2020. The group was still very active (EMBO workshop), got significant funding from ANR and publish in prominent journals (1 *EMBO J.* on identification of effectors of the TOR signaling cascade in response to auxin; 1 *Nucleic Acid R.* on mechanisms of translation reinitiation in plants; 1 *Nucleic Acid R.* on viral RNA export). The team leader also had a long-term consulting activity at the Biotech company PROTEUS.

## WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
Professors and associate professors	1
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
<b>Subtotal permanent personnel in active employment</b>	<b>4</b>
Non-permanent teacher-researchers, researchers and associates	1
Non-permanent research supporting personnel (PAR)	1
Post-docs	2
PhD Students	2
<b>Subtotal non-permanent personnel</b>	<b>6</b>
<b>Total</b>	<b>10</b>

## EVALUATION

### Overall assessment of the team

**The team has an excellent scientific production in the past quinquennial. The team leader has a very good capacity to maintain financial resources through European (two Marie Curie fellowships) and national contracts (carrier of two ANR type contracts). Due to the limited size of the team with few permanent staff (1 permanent scientific), workforce relies highly on contracts of doctoral school or agencies.**

### Strengths and possibilities linked to the context

The team research results on TOR pathway controlling basic life functions such as translation, transcription, cell differentiation and several phytohormones and stress responses in plants are well presented. The production is original and based on novel findings. Among numerous results, the committee noticed the elucidation of cap-dependent translation initiation control by TOR in plants through the auxine and spermidine pathway signalling. They also have completed the protein signalling network of TOR with its upstream electors and downstream targets. They developed a new technique of ribosomal profiling to control ribosomal complex alone mRNAs and studied the effect of TOR on mRNA occupancy.

While dealing with a highly competitive field, the research performed by the team led to 14 publications, among which six reviews and eight original articles as main contributor, certain were published in highly ranked journals (*EMBO J.*, 2017 and 2 *Nucleic Acid Res.*, 2021). Finally, publication of five reviews testifies to the recognition of the group in the cell translation machinery research field (*Plant Physio.*, 2018; *J Exp Bot.*, 2019). In total, the team 13 had an excellent production in terms of quantity.

The team has supervised three PhD students supported by one French ministry fellowships (for a 4-year PhD) and two doctoral contrat from CNRS. Each PhD student have submitted their thesis and have published at least between two to four papers (*EMBO J.*, *Nucleic Acid R.*, *New Phytol.* *Plant J.*), and all as first or second authors.

The team leader have a very good capacity to maintain financial resources through European (two Marie Curie fellowships) and national contracts (carrier of two ANR type contracts).

The team leader received support from EMBO and was the main organizer of the first EMBO workshop on Target of rapamycin (TOR) signaling in photosynthetic organisms (near Strasbourg, 2018). The team leader is a part of the organizing committee of the second EMBO workshop on TOR signaling pathway in plants (Virtual, Portugal, 2021) and the third EMBO workshop to be held in 2023-2024.

### Weaknesses and risks linked to the context

Interaction with social, economic and cultural environment is non-existent.

No article review activities have been mentioned in the report.

Although the team leader has demonstrated all his qualities as a researcher and leader, the size of the team has become critical at the beginning 2021.

During the mandate period, the size of the team decreased from 1 PR, 1 DR, 1 CR and 1 IE to 1 DR and 2 Post-Docs in 2020-2021.

## RECOMMENDATIONS TO THE TEAM

Due to the limited size of the team (1 permanent scientific), workforce relies highly on contracts from the doctoral school or national/international agencies. The group is going to an end due to retirement of its only permanent member.

**Team 14:** Plant isoprenoid biology  
 Name of the supervisor: Mr Hubert Schaller

## THEMES OF THE TEAM

The team investigates fundamental aspects of plant isoprenoid metabolism centered on deciphering gene and enzyme activity in metabolic pathways and by implementing molecular sensors using advanced analytical techniques.

This team is internationally recognized for its expertise in plant cell biology, biochemistry, and functional phytochemistry, particularly in the areas of lipid, phytosterol and isoprenoid biology. Working in the field of integrative biology of photosynthetic organisms and associated microorganisms, research in this team is centred on deciphering gene and enzyme activity in metabolic pathways. The team has shown that specific enzymes from the mevalonate pathway drive metabolic reprogramming in plants.

## CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The quality of publication had been improved. The team has produced 10 research papers (first or last or corresponding author) and 4 review papers (corresponding author).

The team has a very good record of publications and other outputs such as the organization of a scientific conference. However, the team has only two defended doctoral thesis (2017, 2019). The team incorporates 3 doctoral students and 3 postdoctoral scientists. Each works on distinct topics within the scope of the team.

## WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
Professors and associate professors	1
Lecturer and associate lecturer	0
Senior scientist (Directeur de recherche, DR) and associate	1
Scientist (Chargé de recherche, CR) and associate	2
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	1
<b>Subtotal permanent personnel in active employment</b>	<b>5</b>
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	2
Post-docs	3
PhD Students	3
<b>Subtotal non-permanent personnel</b>	<b>8</b>
<b>Total</b>	<b>13</b>

## EVALUATION

### Overall assessment of the team

**While the team has a very good record of publication, this could be improved. The papers were produced by 3 doctoral students and 3 postdoctoral scientists, who work on a diverse range of projects. Better integration of research topics may enhance output in the future.**

### Strengths and possibilities linked to the context

The team has 4 permanent researchers, including three with HDR. This provides a strong framework for scientific production and the future development of the team. The team has recognized know-how in the field and the team has shown good capacity to enter new fields (genetics, genomics, plant-microorganisms interactions). However, it is important to build and strengthen capacity in each of the new research directions.

### Weaknesses and risks linked to the context

The team has few weaknesses. However, the team must maintain a coherent research focus and not diversify its research directions without sufficient funding to effectively exploit these opportunities.

## RECOMMENDATIONS TO THE TEAM

The molecular nature of the plant bacteria interaction must be further investigated.  
The team should be more aggressive towards obtaining ANR and (or) european grants.  
The team's research efforts should be consolidated by more abundant publications.

**Team 15:** Plant epigenetic regulation and inheritance

Name of the supervisor: Mr Wen-Hui Shen and Mr Jean Molinier

## THEMES OF THE TEAM

The team works in the broad areas of chromatin-based regulation of gene expression, notably in the context of the control of flowering time (W. H. Shen) and DNA repair, with a particular emphasis on the roles of small RNAs and DNA methylation in this process (J. Molinier). The team has been restructured in the last mandate and did not answer in a detailed manner the Standard questions of the self-evaluation report. The team belongs to an ITN and has established a collaboration with a UV-boosting company to explore applications in the future.

## CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The previous Shen team was recommended to develop genome-wide approaches to move beyond the phenotypic level and provide further information on the chromatin-related genes. One researcher (A. Berr) left the team for another one whereas the arrival of another one, J. Molinier, may bring this expertise into the group that has been restructured in this quinquennial.

## WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
Professors and associate professors	0
Lecturer and associate lecturer	0
Senior scientist (Directeur de recherche, DR) and associate	2
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
<b>Subtotal permanent personnel in active employment</b>	<b>3</b>
Non-permanent teacher-researchers, researchers and associates	1
Non-permanent research supporting personnel (PAR)	1
Post-docs	0
PhD Students	2
<b>Subtotal non-permanent personnel</b>	<b>4</b>
<b>Total</b>	<b>7</b>

## EVALUATION

### Overall assessment of the team

**The team's structure has been modified substantially with the arrival of a co-PI in September 2020 from another IBMP team and the departure of one permanent researcher for another IBMP team. As a result, the team is still in the process of consolidating, in the view of defining a clear scientific strategy. Nonetheless, the publication record is excellent.**

## Strengths and possibilities linked to the context

The scientific production is excellent (37 articles involving the PI, 7 involving the Co-PI and none involving both) and involves many collaborations, mostly with China. The team is partner of an ITN dedicated to providing training in chromatin studies in plants. The co-PI is also the co-founder and head of the GDR EPIPLANT, which provides a common forum for the French community working on plant epigenetics.

## Weaknesses and risks linked to the context

The team has seen major changes in its structuring, and there is still no indication that the PI and co-PI are involved in joint projects. The end of the LIA with China will undoubtedly affect the productivity of the team.

## RECOMMENDATIONS TO THE TEAM

The team needs to elaborate a well-defined scientific strategy.

The team may consider applying for an IRP CNRS to continue its collaboration with China.

**Team 16:** Ins and outs of viral infection in plants  
 Name of the supervisor: Ms Véronique Graff and Mr David Gilmer

## THEMES OF THE TEAM

The team studies the movement of virus through vascular tissues. They use a combination of cellular and biochemical approaches and in particular they have developed a method to infect Arabidopsis protoplasts. The studies of the proteins involved in viral movement suppression of viruses have been specially significant. The team collaborates with other teams of the IBMP in order to enhance the scope of their work.

## CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The previous report recommended that the team tries to publish in more interdisciplinary journals and that they promote their results through publications of review articles. These recommendations have been followed in part.

## WORKFORCE OF THE TEAM

<b>Permanent personnel in active employment</b>	
Professors and associate professors	2
Lecturer and associate lecturer	1
Senior scientist (Directeur de recherche, DR) and associate	1
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
<b>Subtotal permanent personnel in active employment</b>	<b>5</b>
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	0
Post-docs	1
PhD Students	6
<b>Subtotal non-permanent personnel</b>	<b>7</b>
<b>Total</b>	<b>12</b>

## EVALUATION

### Overall assessment of the team

**The team conducts very good to excellent innovative research with a strong publication record and with many international collaborations. They contribute to training in virology through PhD and Masters programmes.**



## Strengths and possibilities linked to the context

The team conducts internationally leading research in molecular virology and in the review period published 17 important papers many in high quality journals and specialist virology journals. They made several key discoveries, for example, understanding the molecular mechanism of action of the P0 silencing suppressor, studies on ncRNA of BNYVV sgRNA3 revealed that it is essential to systemic spread of the virus, development of recombinant TuYV VIGS vectors that were used for functional analysis of phloem-restricted genes and the discovery of nuclear export of viral RNAs via the TREX pathway.

They collaborate with experts internationally as well as national and internal colleagues. They have a good record of training PhD students who contribute to the team and whose work is recognised in publications. They also contribute to a Masters in Virology. The team make excellent contributions to knowledge of molecular plant virology.

## Weaknesses and risks linked to the context

In comparison with other teams the links to industry seem relatively weaker although a student of the team is paid by a company. This is understandable due to the mandate to conduct fundamental research. However, they have established a joint lab with the company Florimond-Desprez which has resulted in closer collaboration and creates the opportunity for pull through innovations.

## RECOMMENDATIONS TO THE TEAM

Consider how the fundamental research, for example, exploiting knowledge of host susceptibility factors, can be exploited to develop IP and products to control virus diseases.

The team should make sure to optimize the scientific integration of the new senior member.

The team should better coordinate with other IBMP teams working on dsRNA.

## CONDUCT OF THE INTERVIEWS

### Dates

**Start:** 17 October 2022 at 14h00

**End:** 19 October 2022 at 17h00

**Interview conducted: on-site**

### INTERVIEW SCHEDULE

October 17, 2022

14:00-14:15	Presentation of the evaluation process and of the committee to the unit
14:15-15:15	General presentation of the unit (20 min + 40 min)
15:20-15:50	Team P. Giege (E08)
15:55-16:25	Team AM Duchêne - L. Drouard (E04)
16:30-17:00	Team J. Gualberto (E09)
17:05-17:20	Team K. Hammani (E10)
17:20	Debriefing + coffee

October 18, 2022

8:30-9:00	Team T. Blevins (E02)
9:05-9:35	Team C. Ritzenthaler (E12)
9:40-10:10	Team D. Gilmer - V. Ziegler-Graff (E16)
10:15-10:30	Team M. Heinlein (E11)
10:35-10:50	Team L. Ryabova (E13)
10:50-11:50	Debriefing + coffee break 11:50-12:20 Team D. Gagliardi (E05)
12:25-12:55	Team WH Shen - J. Molinier (E15)
12:55-14:00	Lunch
14:00-14:30	Team ME. Chaboutte (E03)
14:35-15:05	Team P. Genschik (E07)
15:10-15:40	Debriefing + coffee break
15:45-16:15	Team P. Achard (E01)
16:20-16:50	Team E. Gaquerel (E06)
16:55-17:25	Team H. Schaller (E14)
17:30-18:20	Presentation of platforms (5 min + 5 min) V. Cognat - Bioinformatics A. Alioua - Gene expression N. Baumberger - Protein production J. Mutterer, M. Erhardt - Microscopy D. Heintz - Metabolomics
18:20-19:00	Debriefing + coffee

October 19 2022

08:30-9:00:	Discussion with technical staff (in French; without direction)
09:10-9:40:	Discussion with the PhD students and non-permanent researchers
09:50-10:20	Discussion with permanent scientists (without direction)
10:20-11:00	Coffee break
11:00-11:30	Discussion with the governing bodies
11:30-12:30	Discussion with the direction of IBMP
12:30-14:00	Lunch and discussion
14:00-17:00	Debriefing + coffee 17:00 Closed meeting

### PARTICULAR POINT TO BE MENTIONNED

None. At variance with the previous evaluation no outside interferences of the reviewing process are to be reported. Scientific discussions between the panel and the IBMP teams were thus relaxed and of very high general scientific quality. The IBMP management structure must be commended for dealing efficiently with these matters.

## GENERAL OBSERVATIONS OF THE SUPERVISORS

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

Strasbourg, le 18 avril 2023

**Objet** : Rapport d'évaluation DER-PUR230023134 - IBMP - Institut de biologie moléculaire des plantes

Réf. : RB/FF/ 2023-210

**Rémi Barillon**

Vice-Président Recherche,  
Formation doctorale et Science  
ouverte

Cher Collègue,

Nous vous remercions ainsi que tous les membres du comité HCERES pour le travail d'expertise réalisé sur l'unité de recherche « Institut de biologie moléculaire des plantes » (IBMP-UPR 2357).

La tutelle CNRS a indiqué qu'elle n'émettrait pas de réponse de type « observations de portée générale » suite au rapport d'évaluation transmis.

**Affaire suivie par :**

Florian Fritsch  
Responsable du département  
Administration de la recherche et  
accompagnement des chercheurs  
Tél : 03.68.85.15.19

[florian.fritsch@unistra.fr](mailto:florian.fritsch@unistra.fr)

L'Université de Strasbourg souhaite exprimer les observations de portée générale suivantes :

- **Page 11 : Weaknesses and risks linked to the context**

*"The duration of most theses exceeds 36 months: the average duration of the 50 theses defended is 42 months and 23 theses lasted during 43 and 51 months."*

The average thesis duration in Life sciences and Health is about 42 months (at the university of Strasbourg, but also at the national level), in line with international standards in these disciplines.

Furthermore, what is deemed important is that doctoral students are financed till the end of the thesis in particular when exceeding 36 months. The Life and Health doctoral school (ED414) has strict rules to make sure and that the extension of a thesis is not detrimental to the PhD student financial situation.

**Direction de la recherche et de la valorisation**

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Rémi Barillon

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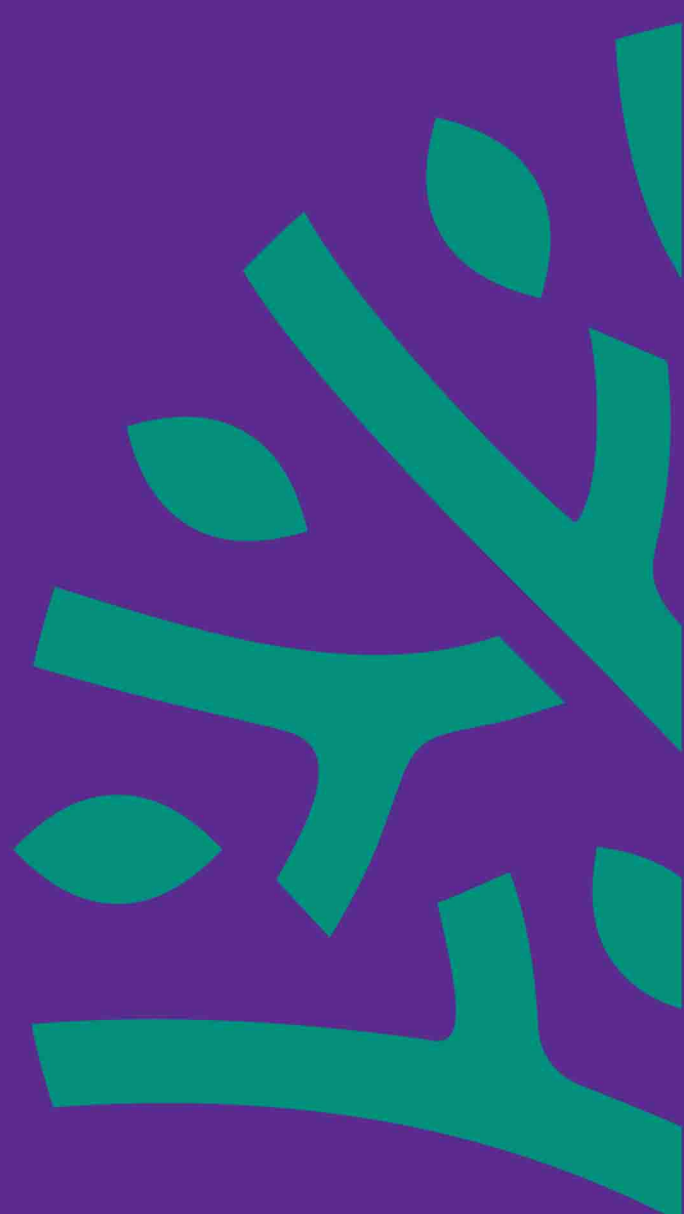
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**Evaluation of the academic formations**

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