Evaluation of Research

EVALUATION REPORT ON THE UNIT:

Melis - Mécanismes en sciences intégratives du vivant

UNDER THE SUPERVISION OF INSTITUTIONS ANS RESEARCH BODIES:

Université Claude Bernard Lyon 1 - UCBL,
Centre national de la recherche scientifique - CNRS,
Institut national de la santé et de la recherche médicale - Inserm

EVALUATION CAMPAIGN 2025-2026
GROUP A

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High Council for the evaluation of research and higher education

On behalf of the committee of experts:

Pierre Leopold, Chairperson of the committee

For Hcéres:

Coralie Chevallier, President of Hcéres

In accordance with articles R. 114-15 and R. 114-10 8° of the Research Code, evaluation reports drawn up by the committees of experts are signed by the chairpersons of these committees and countersigned by the president of Hcéres.

To facilitate the reading of the document, the terms used in this report to designate functions, occupations or responsibilities (expert, researcher, teacher researcher, professor, lecturer, engineer, technician, director, doctoral student, etc.) are generic and gender neutral.

This report is the outcome of an evaluation by a committee of experts the composition of which is specified below. The assessments it contains are an expression of the independent and collegial deliberation of the committee. The data within it are the certified accurate data extracted from the application forms submitted by the supervising bodies on behalf of the unit.

This version of the report is public under Article R. 114-23 of the Research Code. Sections of the report considered confidential, and responses to points of attention from supervisors are not included in it.

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UNIT CHARACTERISATION

- Name: Mécanismes en sciences intégratives du vivant
- Acronym: Melis
- Label and number: CNRS UMR 5284, Inserm U1314
- Number of teams: 11
- Composition of the executive team: Pr Jean-Louis Bessereau, Director; Dr Valérie Castellani, Deputy Director; Pr Christophe Marcelle, Deputy Director

SCIENTIFIC PANELS OF THE UNIT

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

THEMES OF THE UNIT

The teams of MeLiS share a common interest in developing ambitious, curiosity-driven research in the field of developmental and cellular biology, with a specific emphasis on neural and muscle biology and the aim of translating their knowledge into medical applications. Research at MeLiS makes use of a variety of cellular and animal models ranging from C. elegans, Drosophila, zebrafish, and chick.

HISTORIC AND GEOGRAPHICAL LOCATION OF THE UNIT

MeLiS has emerged recently from the restructuration of a large research unit called NeuroMyoGene into two seprate entities, MeLiS and PGNM, sharing a common administration support (INMG-UAR). MeLiS is located on the University Claude Bernard Lyon 1 campus, in close proximity to research institutes like the CRCL, CRNL, SBRI, ISC and a General Hospital (Hospices Civils de Lyon).

UNIT RESEARCH ENVIRONMENT

MeLiS contributes actively to shaping both local and national research environments. It is part of the PIA LabEx program CORTEX, which was renewed for 2020–2024 (J.-L. Bessereau, Director). Several MeLiS teams participate in other national projects, including LabEx DevWeCan for the NEST team, the RHU4 BETPSY project for the SYNATAC team, and MyoNeurAlp for the MDR team.

The technological impact of MeLiS is evident through its strong involvement in the Lyon Multiscale Imaging Center, which includes three imaging platforms and is supported by France Bio-Imaging. The MeLiS researchers are in charge of the national *C. elegans* gene-editing facility (SEGiCel), the French rare disease reference center for PNS and AE and they have established the first quail transgenic facility.

MeLiS is also involved in the Pierre Wertheimer Clinical Research Institute in Neurosciences, located at the Lyon-Est Hospital. It is associated with the University Claude Bernard Lyon 1 and ENSL through the ANR Neuroscience Graduate+ program for Master's and PhD students. In parallel, an International Master's program in Life Sciences, at the interface between Biology and Physics, has been created. This program attracts students who subsequently obtain PhD positions in leading European research institutes.

Finally, an ambitious MD/PhD track has been launched by the MeLiS Director.

UNIT WORKFORCE: IN PHYSICAL PEOPLE AS OF 31/12/2024

Catégories de personnel	Effectifs
Professeurs et assimilés	8
Maitres de conférences et assimilés	12
Directeurs de recherche et assimilés	2
Chargés de recherche et assimilés	11
Personnels d'appui à la recherche	28
Sous-total personnels permanents en activité	**61**
Enseignants-chercheurs et chercheurs non permanents et assimilés	15
Personnels non permanents d'appui à la recherche	0
Post-doctorants	0
Doctorants	19
Sous-total personnels non permanents en activité	**34**
Total personnels	**95**

BREAKDOWN OF THE UNIT'S PERMANENT STAFF BY EMPLOYER: IN PHYSICAL PEOPLE AS OF 31/12/2024. NON-SUPERVISING EMPLOYERS ARE GROUPED ON THE HEADING "OTHERS".

Nom de l'employeur	EC	C	PAR
UCBL	16	0	13
CNRS	0	5	8
Inserm	0	8	4
Autres	4	0	3
Total personnels	**20**	**13**	**28**

GLOBAL ASSESSMENT

MeLiS is a dynamic and internationally competitive research unit dedicated to innovative basic research in developmental and cell biology, with strong translational links to human health. Its work spans neuronal, muscular, and organismal development, as well as neurodevelopmental, neurological, and muscular diseases, fully aligning with the missions of the University Claude Bernard Lyon 1, Inserm, and CNRS. MeLiS has built a dense network of internal and external collaborations, supported by shared technologies, interdisciplinary projects, and strong integration into local, national, and international research ecosystems.

The unit benefits from robust, although not immense, institutional funding and has been highly successful in securing highly competitive grants, including ERC, RHU, ANR, and charitable funding. Strategic investments in cutting-edge technologies, advanced imaging (STED, light-sheet, expansion microscopy), single-cell and spatial transcriptomics, and high-quality human samples, have strengthened both basic and translational research. MeLiS hosts renovated premises, major models and imaging platforms, and emerging infrastructures such as the 3D-HUMAN platform.

MeLiS is attractive for training, hosting many PhD students and contributing to international graduate programs, while fostering a supportive, fair, and gender-aware working environment. The unit emphasizes well-being, safety, data security, sustainability, open science, and ethical research standards.

Its scientific productivity is high, with 233 publications (2019–2024) in leading journals, strong international collaborations, prestigious awards, and significant outreach and societal engagement.

Key challenges remain. These include unequal funding between teams, limited attractiveness to postdoctoral researchers, improvable computational/image analysis capacity, gaps in electron microscopy, proteomics, and bioinformatics expertise, and limited start-up packages for new PIs. The anticipated retirement of five senior team leaders requires careful planning to ensure renewal through transparent, competitive recruitment with adequate laboratory space, mentoring, and gender balance. Additional concerns include the potential weakening of hospital links, the closure of shared administrative support (INMG–UAR) in 2026, and the need to strengthen scientific animation and international visibility.

Overall, MeLiS stands out as a vibrant, excellent to outstanding collaborative institute that effectively integrates fundamental discovery, technological innovation, clinical relevance, and societal impact. Addressing identified structural and human-resource challenges will be critical to sustaining its excellence and leadership in the coming years.

DETAILS OF THE EVALUATION OF THE UNIT

A - CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

MeLiS emerged recently (2022) from the restructuration of INMG and no recommendation was made on the general organisation and strategy of the Institute. Recommendations for teams have been made, which are being addressed in the team's reports.

B - EVALUATION AREAS

EVALUATION AREA 1: THE UNIT'S SCIENTIFIC OBJECTIVES, ORGANIZATION AND RESOURCES

Assessment of the unit's scientific objectives, organization and resources

MeLiS pursues high-level scientific objectives and implements a coherent strategy to achieve them. Research at MeLiS is oriented toward understanding basic mechanisms with the goal of translating knowledge to human diseases. Among the strengths of MeLiS are its technological developments and the high collegiality of its internal organization, the relatively small size of the unit promoting efficient communication between its members and the leadership. MeLiS benefits from solid funding, consisting of a limited institutional endowment but important research contracts secured by the teams.

Context-related strengths and opportunities

MeLiS is a dynamic research unit whose mission is to advance innovative basic research in developmental and cell biology and translate this knowledge to human health. Its teams address organismal complexity across diverse contexts, from neuronal and muscle development to neurodevelopmental, neurological, and muscular diseases. This scientific vision fully aligns with the goals of the University Claude Bernard Lyon 1, Inserm, and CNRS. MeLiS has built a strong network of internal collaborations, enabling shared technologies, funded projects, and interdisciplinary initiatives. Its integration into local networks, including two LabEx structures and hospital partnerships, reinforces its leadership. Strategic investments in advanced imaging platforms (STED, light-sheet, expansion microscopy) and growing expertise in single-cell transcriptomics, strengthened by the recruitment of a junior PI in 2024, further enhance its research capacity. MeLiS also supports translational research through access to high-quality human samples and strong clinical collaborations, linking model-organism studies to human genetic diseases.

Institutional funding (325 k€ annual endowment plus ~4 M€/year in salaries) plays a key strategic role in sustaining shared infrastructure and collective initiatives. Transparent, consensus-based budgeting supports major equipment acquisitions and PI needs. The unit is successful in attracting highly competitive funding, with ~4 M€ in contracts in 2024 alone (including ERC, RHU, ANR, INCa, ATIP, charities, and private funding).

MeLiS is also attractive to students, hosting many trainees and PhD candidates (22 ongoing PhDs; 32 defenses in 2022–24) and contributing strongly to international and interdisciplinary training programs (International Master in Life Sciences, Graduate+ ANR, Neuro+ SFRI, MD-PhD). Support for staff development and recent recruitments (2 CRCN, 1 MCU, 3 engineers in 2022–24) reflect a healthy and supportive environment.

The unit benefits from renovated premises and access to major university platforms (fish, rodents, ANIPHY, ProfileXpert, CIQLE), as well as a unique quail transgenesis facility. The new 3D-HUMAN platform, equipped with state-of-the-art light-sheet microscopes, illustrates ambitious plans for human developmental studies. Strong in-house expertise ensures efficient maintenance and shared use of equipment.

MeLiS operates under the HR rules of its supervisory bodies. Gender ratios are 39/60 for staff and 17/37 for PhD students, with a marked underrepresentation of women among team leaders (6/2). Despite limited female applicants to a recent call, the unit prioritizes female recruitment and actively supports women through mentoring, coaching, and encouragement toward funding and promotion.

Training is strongly promoted through safety, technical, and transversal programs, supported by annual assessments and HR partners. Since 2022, efforts to promote permanent staff through internal coaching have increased. Well-being, safety, and psychosocial risk prevention are priorities, supported by a climate of trust, active dialogue, and dedicated safety officers. Data security relies on RAID5 systems, daily backups, controlled access, and a disaster recovery plan. Sustainability efforts are supported through the GreenLab initiative, promoting waste reduction, energy savings and environmental awareness.

Discussions with staff categories revealed an overall very positive assessment. Faculty and researchers appreciate the unit's size, collaborative climate, and strong collective life since the split from the former unit. Points of attention include administrative workload, uneven task distribution, publication practices, HDR support, and external seminar attractiveness. Engineers and technical staff value scientific integration and trust but request clearer internal communication, more training access, internal regulations, and anticipation of workload linked to the planned UAR closure. PhD students and postdocs report good support but request more internal seminars, better bioinformatics and statistics support, improved onboarding and communication, a designated harassment contact person, and guidance on non-academic career paths.

Context-related weaknesses and risks for the four references above

Despite the notable strengths of the unit, several areas of attention should be addressed proactively to ensure the long-term development and competitiveness of all teams:

- A first point relates to unequal funding levels across teams, which may become restrictive for some groups in the near future. Ensuring a more balanced allocation of resources or a "solidarity"-oriented organization of the unit budget in case of urgent need could prevent disparities from widening further.
- The unit seems not attractive to postdoctoral fellows. Although this has become a systemic problem in biological research across European institutes, the situation at MeLiS stands out as particularly noticeable. This is partially compensated by the presence of an important pool of permanent researchers/ MCU in several teams. This remains a critical issue since the postdoctoral flow plays a central role in driving scientific innovation and ensuring competitiveness of research teams. A thorough evaluation of the underlying reasons for this lack of attractiveness, together with concrete proposals to improve the situation should be developed in the future.
- The imaging platform stands out as a well-established and productive technological resource. However, its full potential could be constrained by the absence of a dedicated image analysis strategy. Advanced computational processing and quantitative analysis are increasingly indispensable for exploiting modern imaging datasets.
- The lack of continuity in electron microscopy expertise (and a rather obsolete instrument) could also become limiting for some teams. Parallel to this, the unit would benefit from reinforcing its bioinformatics capacity, as high-end computational expertise is increasingly required across multiple research lines. A strong proteomics expertise could also contribute to the development of specific projects and is not present in the direct environment of the unit.
- The upcoming departure of five senior team leaders requires planning for an important renewal of the unit and for maintaining a satisfactory ratio of junior to senior teams. Special attention should be given to the procedures for recruiting future group leaders, ensuring that existing teams are not simply maintained after retirement through the co-optation of internal team members as PIs without undergoing an official selection process.
- Linked to the previous point, the renewal of the unit has already begun, with the recruitment of two teams and the possible hosting of an existing one. Anticipating future retirements must be accompanied by the provision of adequate laboratory and office space for incoming teams. Future discussions with funding bodies should therefore ensure that these teams are allocated the necessary space within MeLiS.
- The evaluation committee also noted that there is no mention of specific start-up packages for newly recruited teams. Such support is crucial for rapid integration, early scientific output, and the ability to attract additional funding. Considering future renewal, particular attention to gender balance in recruitment strategies will also be important to improve equity within the unit. Following the recommendation made by the SAB, specific

attention should be given to provide strong mentoring to newly recruited PIs during their early years, including help with grant applications and recruitment strategies.
- The departure of several senior PIs with strong links with the hospital could weaken interactions between the research unit and the clinics.
- The closure of INMG–UAR administrative support at the end of 2026 represents a significant organizational risk. Given the critical shared technical resources associated with the UAR, a replacement strategy must be developed in coordination with all funding bodies to ensure the continuity of efficient administrative management. Simply dividing the existing pool of UAR human resources between the two units does not appear to be a viable option, as the UAR also includes shared technical facilities (tissue culture, microbiology, washing facilities, etc.) that function effectively and would be adversely affected by the loss of a common organizational structure.
- Finally, scientific animation could be enhanced. Increasing the frequency and diversity of invited seminars would strengthen external engagement and enrich the scientific culture and the visibility of the unit.

EVALUATION AREA 2: THE UNIT'S SCIENTIFIC RESULTS, IMPACT AND ATTRACTIVENESS

Assessment of the unit's scientific results, impact and attractiveness

MeLiS shows excellent to outstanding innovative, multidisciplinary research with major advances in both basic and translational aspects. International collaborations, major grants, visible publications, training, and scientific leadership reinforce its visibility. Challenges include recruiting postdocs, long in vivo experimental timelines, limited institutional support for junior PI, heavy duties for some leaders, upcoming retirements, and uncertainties for administrative support.

Context-related strengths and opportunities

The MeLiS institute has demonstrated strong scientific productivity and innovation across multiple disciplines, positioning itself as a visible entity for biological and biomedical research. All teams participated in this success through creative discoveries using the power of a variety of models, and establishing broad international collaborations that advanced both basic scientific knowledge and clinical translation.

During the previous period, important scientific advances have been made across diverse biological systems, from ciliogenesis and synapse organization to muscle biology and neurodevelopment. New therapeutic strategies emerged, including innovative cell-based delivery approaches and refined pipelines for rare-disease gene variant analysis. Cutting-edge model systems, from avian embryos to zebrafish and *C. elegans*, revealed fundamental mechanisms underlying cancer aggressiveness, neural wiring, and muscle function. Comprehensive resources such as large-scale biobanks and genomic target maps benefit broader scientific communities.

International collaboration appears as a strength of MeLiS. Each team benefits from partnerships across Europe, North America, and Asia, allowing access to unique datasets, complementary expertise, and multidisciplinary programs. These collaborations have supported important studies, from neuroblastoma biology to synaptic architecture, potassium-channel function, microfluidic imaging, and human-cell-atlas initiatives.

MeLiS researchers have been very successful in securing competitive funding. The institute hosts ERC Advanced and Synergy grants, ETN support, ANR funding, RHU awards, and numerous national and regional grants. University investments further strengthened MeLiS infrastructure, financing advanced imaging platforms and a transgenic quail facility.

Training and scientific visibility are central to MeLiS's mission. The institute welcomes students at all levels and provides a rigorous environment for research training. Several awards, distinctions, and society memberships, including EMBO elections, national honors, and scientific prizes (Krieg Cortical Discoverer Award, CNRS Bronze medal), underscore the international recognition of MeLiS scientists.
MeLiS members contribute actively to scientific leadership by organizing international conferences, chairing symposia, serving on editorial boards and participating in national and European scientific committees. These efforts significantly enhance the visibility and influence of the institute.

The unit applies standards for research quality, reproducibility, and ethics, with strict adherence to ARRIVE, PREPARE, and 6R principles. Many teams rely on alternative model organisms, reducing animal use when possible. MeLiS also supports open science through HAL, PubMed Central, and public data repositories.
With 233 publications between 2019 and 2024, including some high-impact papers in *Cell, Nature*, *Nature Communications*, *EMBOJ.* and *Current Biology,* MeLiS demonstrates both productivity and scientific depth.

Overall, MeLiS is a vibrant, collaborative institute whose scientific production, international partnerships, and commitment to excellence make it a strong contributor to national and international biomedical research.

Context-related weaknesses and risks

The unit faces some challenges that are shared with many research institutes of this size and visibility in the French system and beyond. Attracting postdoctoral researchers remains difficult, which can limit the capacity of teams to fully develop their scientific programs. The relatively long timelines often needed to complete in vivo studies and bring results to publication, is a factor that may place additional pressure on newly established teams as they work to secure competitive funding. Starting packages for junior PIs are limited, which can reduce the attractiveness of the Institute for junior PI candidates. Some team leaders carry substantial teaching commitments and/or participate in multiple expert committees and institutional roles. While these activities contribute positively to the academic community and the visibility of the institute, they can reduce the time available for research management and planning. Looking ahead, the anticipated departure of five senior team leaders by the end of the next contract period may create gaps in expertise and introduce challenges in finding the resources for renewing several teams at once. In this respect, the ending of the Labex CORTEX program, without a replacement funding source, adds a degree of financial uncertainty. More generally, strengthening the visibility and impact of research outputs across several teams would help reinforce the unit's scientific profile and its international leadership. In that line, the recruitment of talented young group leaders appears like a strong initiative.

EVALUATION AREA 3: INCLUSION OF RESEARCH ACTIVITIES IN SOCIETY

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

The MeLiS unit drives innovation through strong industry, clinical, and societal partnerships. Teams like SPARK, NeuraCel, SynatAc, and NEST have developed technologies, patents, and spin-offs while engaging patient groups to ensure clinical relevance. Extensive outreach, education, and university teaching reinforce its societal role. Overall, MeLiS effectively succeeded in turning basic research into societal benefits.

Context-related strengths and opportunities

MeLiS demonstrates a strong and coherent strategy for fostering innovation through collaborations with industry, clinical partners, and society. Several teams have successfully developed productive partnerships with private companies, illustrating the Institute's ability to translate fundamental biological insights into technological advances. The SPARK team's collaboration with ViewPoint within the ANR PRCE Fleggsibility project is a good example combining academic expertise with industrial know-how in machine learning and imaging technologies, generating an innovative technique for long-term monitoring of *C. elegans* behavior. Similarly, the NeuraCel team's joint work with a Swiss EPFL spin-off on new AI-based image analysis tools reflects MeLiS' forward-looking approach to emerging technologies.

The SynatAc and NEST teams further distinguish themselves through strong engagement with industrial and socio-economic partners. With the support of LabEx CORTEX and SATT PULSALYS, they have advanced key valorization projects, including contributions to portable OPM-based magneto-encephalography. Both teams maintain close ties with patient associations — ARTC, ENMDAR, and networks such as React4Kids — ensuring that research remains grounded in clinical needs and societal challenges. This integration of patient perspectives enhances both the relevance and visibility of MeLiS' work.

SynatAc has demonstrated very successful translational research, driven by its close connection to clinical practice. Under the leadership of JH, the team has developed more than 30 diagnostic tests now used in routine laboratories and has licensed patents to major international companies. NEST has also had substantial impact through the creation of the Oncofactory spin-off, which developed a unique preclinical platform using avian embryo microtransplantation. The acquisition of Oncofactory by the ERBC group and multiple patent licenses testify to the maturity and industrial relevance of the team's innovations. Recent collaborations with VIDIUM further illustrate their capacity to integrate advanced AI tools into cancer research.

Beyond scientific and technological achievements, MeLiS maintained a strong commitment to outreach and public engagement. Its members actively participate in conferences, festivals, podcasts, and educational programs, producing accessible materials such as films for the Science Festival and articles for the general scientific press. Their involvement with charities, school initiatives, and public events also contributes to strengthening dialogue between science and society.

Finally, MeLiS plays a vital role in training future generations. Researchers and clinicians provide high-quality teaching at university level, while also engaging younger students through school visits, science workshops, and internships. These activities foster early interest in scientific careers and reinforce the Institute's educational mission.

Overall, MeLiS stands out for its very dynamic integration of basic research, innovation, clinical relevance, and societal outreach. Its achievements underscore an ecosystem where scientific discoveries are effectively transformed into applications with tangible benefits for patients and society.

Context-related weaknesses and risks for the three references above

Without a dedicated structure (e.g., a local Tech Transfer Office) for transferring knowledge from the bench to the economic sector, MeLiS relies on individual initiatives, which increases the burden on team leaders.

ANALYSIS OF THE UNIT'S TRAJECTORY

MeLiS was created only recently (2022), after the restructuring of the INMG. It brings together seven founding teams with long-standing collaborations and shared interests in developmental and cellular biology. Its research strategy centers on in vivo approaches across a unique range of model organisms and provides strong translational potential.

The current director will retire at the end of the period. The transition has been anticipated by nominating one of the current team leaders with an outstanding scientific track as deputy director during the current contract, and promoting her as director for the next contract. The continuity in the management of the unit is ensured by proposing that the current director is part of the new direction team as one of the two co-directors. The respective tasks of the future director and the co-directors are well established.

Since its creation, MeLiS has launched a recruitment strategy to reinforce expertise and anticipate the planned retirement of several senior group leaders between 2027 and 2032. The arrival of the team 8 strengthens visibility and brings cutting-edge expertise in human-embryo 3D microscopy. Two recent competitive calls for new group leaders, guided by the international Scientific Advisory Board (SAB) of MeLiS, led to the selection of two strong candidates, who will join the unit between 2024 and 2026. These recruitments will broaden MeLiS's strengths in neurodevelopment, transcriptomics and disease modeling.

MeLiS stands today as a collegial and internationally competitive unit. Strengths include strong in vivo strategies, advanced genome engineering, an expanding imaging platform (3D-STED, light sheet, expansion microscopy), original models, such as chicken embryos for cancer studies, a unique autoimmune encephalopathy biobank, and the unit PIs' ability to secure prestigious grants (ERC Synergy, ANR Chairs of Excellence, RHU). The presented strategic vision for the next five years builds on these strengths and sets several transversal priorities: integrating human tissue analysis with high-end imaging and genetics; expanding clinical collaborations in neurology, oncology, and pathology; accelerating the deployment of advanced imaging modalities (STED, expansion microscopy, multiplexed 3D labeling); reinforcing transcriptomic expertise through spatial transcriptomics; and developing robust computational and AI-based data (imaging, genomic)analysis. These efforts will require close integration with existing local institutional platforms.

- The most critical upcoming challenges relate to human resources and long-term stability. Five team leaders are expected to retire by the end of the next contract period, representing a substantial loss of expertise. As noted above, the renewal of the unit has already begun with the recruitment of two new team leaders and the possible hosting of an existing team. Future discussions with the directory board should therefore ensure that new teams are allocated adequate laboratory and office space within MeLiS. In this context, converting the space currently occupied by the "Oncofactory" into laboratory space for one of these teams appears to be an excellent option. Hosting the team 10 also seems to be an excellent option, given the convergence between its scientific interests and those of MeLiS, the very positive evaluation of the team's scientific trajectory (see below) and the need to identify a solution for the local continuation of its activity. The committee noted that the team has faced significant difficulties in recent years due to uncertainty regarding its institutional affiliation. Its activity should therefore not be further disrupted during the transition period. Accordingly, the committee recommends that, regardless of the final decision concerning this team, it be maintained in its current space and its administration be transferred to the local Inserm representatives (Delegation régionale).
- In parallel, the unit has implemented transitional structures, such as co-leadership models (e.g. Marcel–Legrand and Honnorat–Pascual), and plans to launch open calls for new group leaders under the supervision of the SAB. Particular attention should be paid to avoiding the co-optation of local researchers without competitive selection processes. This renewal phase also represents an opportunity to improve gender balance among team leaders. Finally, the success of this transition will depend strongly on local commitment to provide adequate start-up packages and attractive recruitment conditions, particularly with respect to laboratory space.
- Administrative and technical support staff represent another pressing concern. Although the unit appears comfortably staffed in terms of number of technicians/engineers, several of them are approaching retirement, threatening the continuity of expertise. In the context of the important unit team renewal to come at the end of the next mandate, a particular effort should be made to ensure that recruited teams receive adequate technical support. This should be a priority for the unit and will require redistributing technician positions from existing teams.
- The committee was concerned by the closure of INMG–UAR at the end of 2026. Discussion with the staff representatives reveals that the UAR services are widely appreciated by all staff members, who support this shared organization. The committee recommends that a concerted effort of all funding bodies is actively pursued in the coming year to establish a long-term shared organization under the responsibility of a director to be recruited for the future period.
- Finally, MeLiS should increase its international scientific visibility and be more attracting to postdoctoral researchers, a widespread challenge for many institutes in basic biological research. New communication tools (website, social media), a dynamic seminar series, and broader outreach efforts that are being developed should enhance recruitment and foster collaborations.RECOMMENDATIONS TO THE UNIT

RECOMMENDATIONS REGARDING THE EVALUATION AREA 1: SCIENTIFIC OBJECTIVES, ORGANIZATION AND RESOURCES OF THE UNIT

- The renewal of the unit has already begun. Future discussions with funding bodies should therefore ensure that new teams are allocated adequate laboratory and office space within MeLiS. Concerning the team 10, the committee suggests that it is maintained in its current space during and after the transition period and that it is administrated by supervising body representatives.
- The unit has implemented co-leadership models for some teams where the current PI is planning to retire. Particular attention should be paid to avoiding the co-optation of local researchers without competitive selection processes. This renewal phase also represents an opportunity to improve gender balance among team leaders. The success of this transition will depend on local commitment to provide adequate start-up packages and laboratory space.
- Several engineer/technician staff are approaching retirement, threatening the continuity of essential expertise. A particular effort should be made to ensure that newly recruited teams receive adequate technical support. This may require redistributing technician positions from existing teams.
- The committee was concerned by the closure of INMG–UAR at the end of 2026. The committee recommends that a concerted effort should be actively pursued in the coming year to establish a long-term shared organization under the responsibility of a director to be recruited for the future period.

RECOMMENDATIONS REGARDING THE EVALUATION AREA 2: THE UNIT'S SCIENTIFIC RESULTS, IMPACT AND ATTRACTIVENESS

- MeLiS should increase its international scientific visibility and be more attracting to postdoctoral researchers, a widespread challenge for many institutes in basic biological research. New communication tools (website, social media), a dynamic seminar series, and broader outreach efforts that are being developed should enhance recruitment and foster collaborations.
- Starting packages will be crucial to ensure rapid integration and early scientific output of junior teams. As pointed out by the SAB, newly recruited PIs should benefit from specific mentoring, helping them to recruit, write grants and apply to career promotions.

RECOMMENDATIONS REGARDING EVALUATION AREA 3: INCLUSION OF RESEARCH ACTIVITIES IN SOCIETY

MeLiS is pro-active and efficient in integrating basic research into clinical relevance and societal outreach. No specific recommendation is made for this aspect.

TEAM-BY-TEAM ANALYSIS

Team 1 : Assemblage des Centrioles et Diversité Ciliaire

Name of the supervisor: Ms Bénédicte Durand

THEMES OF THE TEAM

The team studies the architecture and molecular dynamics of cilia using advanced microscopy, especially expansion microscopy. By comparing diverse models, they aim to uncover how ciliary components function and how their mutations lead to human cilia-related disease.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

Following the previous recommendation, the team completed and published the MSP300 work, discontinued the third aim on MSP300 partners, and shifted efforts toward the emerging Aims1 project, which has since become a central research axis.

TEAM WORKFORCE: IN PHYSICAL PEOPLE AS OF 31/12/2024

Catégories de personnel	Effectifs
Professeurs et assimilés	1
Maitres de conférences et assimilés	1
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	2
Personnels d'appui à la recherche	2
Sous-total personnels permanents en activité	**6**
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels non permanents d'appui à la recherche	0
Post-doctorants	0
Doctorants	2
Sous-total personnels non permanents en activité	**2**
Total personnels	**8**

EVALUATION OF THE TEAM

Overall assessment of the team

The ACDC team demonstrates excellent expertise and international visibility in ciliogenesis research, with pioneering contributions in both fly and mammalian systems. The PI's strong leadership and teaching involvement underpin the team's attractiveness, while the publication record, collaborations, and emerging projects indicate significant scientific potential. The consolidation of junior researcher independence remains an important goal.

Context-related strengths and opportunities

The ACDC team has produced groundbreaking work in the study of ciliogenesis, elucidating key differences between *Drosophila* and mammalian cilia and uncovering remarkable variation in ciliary organization and function across species and tissues. The research on RFX2 and RFX3 transcription factors in mouse motile cilia represents a first comprehensive functional analysis in vivo, revealing compensatory mechanisms and generating a widely used catalogue of RFX target genes. The team maintains strong international collaborations, including partnerships in China and India for *Drosophila* studies and in Germany for proteomics and organoid approaches. The PI is highly active in teaching and coordination, serving as scientific coordinator of the €14M ANR Graduate+ program across four universities, vice-president of the doctoral school, and member of the scientific council of the Service National de la Police Scientifique, reflecting strong leadership and national-level influence. The team's attractiveness is demonstrated by recent recruitments of a CRCN and an AI, and the steady publication record (8 over the period) includes high-profile journals such as EMBO J (2025*), NAR, ELife,* and *HMG*. Recognition for expertise in expansion microscopy, as well as the organization of international meetings and workshops, brings visibility to the team. These factors collectively provide the team with a strong foundation to advance innovative projects, including emerging opportunities in organoid model and integrative approaches to ciliogenesis.

Context-related weaknesses and risks

Senior researchers of the team have co-signed publications with the PI (co-last authorship) and produced one or two publications over the period. The visibility and autonomy of these researchers on ongoing projects could be further strengthened. It will be crucial to provide opportunities for junior members, including the 2023 CRCN, to gradually develop independent leadership within the team's research axes. While past departures of AI staff temporarily reduced continuity, recent recruitments demonstrate the team's capacity to attract talent and revitalize its internal dynamics. Expanding conference participation and enhancing societal outreach would further increase the team's profile and scientific impact. Emerging opportunities, such as organoid-based projects, have strong potential but their implementation is not effective yet. Some of the experimental work is currently conducted in collaboration with laboratories in Paris and Strasbourg, notably for human retinal organoids and live-imaging approaches. While these collaborations provide valuable expertise, the associated logistical constraints appear significant, particularly given that these experiments could potentially be implemented locally. Establishing these approaches within the laboratory would not only streamline logistics but also offer the opportunity to investigate multiple aspects of ciliogenesis—so far mainly studied in cell lines—in more physiologically relevant models such as organoids and cultured neurons, thereby strengthening the translational relevance of the research.

ANALYSIS OF THE TEAM'S TRAJECTORY

Over the next five years, the ACDC team plans to build upon its previous discoveries and established expertise in ciliogenesis, pursuing three complementary research directions. The first aims to elucidate the molecular functions of several ciliopathy-associated complexes that remain poorly understood, linking their activity to specific phenotypic manifestations of ciliopathies. The second seeks to define the description of the primary cilium dynamics during male meiosis, an area not previously explored in depth. The third, led by a dynamic nearly recruited researcher, focuses on membrane dynamics throughout the life cycle of the cilium and how perturbations affect its function. These directions naturally extend the team's prior studies, leveraging its methodological strengths and conceptual insights from *Drosophila* and mammalian systems.
This excellent trajectory is supported by a productive team structure, including recent recruitment of a CRCN and an AI, which enhances the potential to develop new projects and implement innovative approaches such as organoid models and expansion microscopy, while increasing research autonomy. International collaborations remain a key asset, providing access to complementary expertise. Human resources are clearly allocated and recently secured fundings ensure the feasibility of the proposed research program. The reduction in the PI's teaching load will allow her to refocus on research during the upcoming contract period, complete ongoing projects, and prepare for her retirement by promoting Axis 3, led by a junior researcher. Overall, these projects offer promising opportunities for methodological development and translational insights. By strategically integrating new directions with the team's existing expertise, fostering junior researcher independence, and leveraging collaborative networks, the ACDC team is well-positioned to advance its scientific program and expand its long-term impact.

RECOMMENDATIONS TO THE TEAM

The committee encourages the team to further strengthen the independence and visibility of the early-career researcher by defining clear scientific responsibilities, establishing structured mentorship, and implementing thoughtful authorship planning. The funding secured by her will enable the generation of robust preliminary data, significantly enhancing her competitiveness for a future ERC Starting Grant application. Increased participation in international conferences and broader outreach activities would further raise both scientific

recognition and societal impact of the team. The strategic implantation on site of organoid-based models and correlative approaches—such as live imaging followed by expansion microscopy—represents a strong opportunity to maximize scientific innovation. Finally, maintaining balanced growth in staffing, project leadership, and publication output will be essential to consolidate the team's trajectory while fully leveraging its expertise and international networks.

Team 2 : Myogenesis in Development and Repair

Name of the supervisor: Messrs. Christophe Marcelle and Fabien Le Grand

THEMES OF THE TEAM

Team 2 examines the molecular and cellular pathways involved in skeletal muscle development, growth, and tissue repair through research in chicken and mouse models, focusing on myoblast fusion. They collaborate with physicists and mathematicians to investigate the role of mechanical forces and extracellular matrix organization during fusion.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

There is no comment on the previous HCERES report.

TEAM WORKFORCE: IN PHYSICAL PEOPLE AS OF 31/12/2024

Catégories de personnel	Effectifs
Professeurs et assimilés	2
Maitres de conférences et assimilés	1
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	3
Sous-total personnels permanents en activité	**6**
Enseignants-chercheurs et chercheurs non permanents et assimilés	1
Personnels non permanents d'appui à la recherche	0
Post-doctorants	0
Doctorants	2
Sous-total personnels non permanents en activité	**3**
Total personnels	**9**

EVALUATION OF THE TEAM

Overall assessment of the team

The team 2 has reached an excellent level in the field of muscle formation and maintenance.

Context-related strengths and opportunities

The team 2 is very well established, with ten to fifteen people, including three professors/assistant professors and one engineer with permanent positions. They trained six PhD students, four postdocs and several engineers. The team is internationally recognized for its expertise on muscle cell dynamics and they recently developed a new original translational research axis on muscle therapy (hematopoietic stem cells for systemic delivery of gene therapy). It is very well funded with a high number of national grants (ANR and AFM for a total of 2M€). They published three articles (eLife 2020 on quail transgenesis; Nat Comm 2021 on TGFß signaling blocking myoblast fusion; eLife 2022 on TCF/ß-Cat signaling in avian embryonic development); they also had three preprints, two of them published in 2025 (myotube segregation published in Nat Comm in 2025; technological development

of a YAP/TAZ-TEAD reporter published in Dev Biol in 2025); the last preprint is "in revision" (biomechanical aspects of myoblast fusion). Team members gave several oral communications at a very high level (e.g. 1 GRC and 1 EMBO conference) and they are heavily implicated in teaching at all levels.

Context-related weaknesses and risks

The teaching load of the team is very high, with no full-time researcher. The publication record could be higher in quantity for a team of 10-15 people with excellent funding. In particular, it should make sure that all trainees have a first author publication (one PhD student (since 2020) and three postdocs do not have one); moreover, the hiring of three PhD students as postdocs is likely to hinder their employment prospects. Apparently, the team has no contribution towards the socio-economic world or the society which is surprising.

ANALYSIS OF THE TEAM'S TRAJECTORY

One team has joined the team 2 in 2025. Together, they propose an excellent project with five tasks divided in fundamental (muscle patterning) and translational projects (Duchenne muscular dystrophy, DMD). They will first build on the recently published article on primary and secondary myogenesis. The second axis will investigate why primary progenitors maintain a strict segmental identity, whereas secondary progenitors do not in a specific population of late patterning. The last fundamental axis will exploit the expertise in scRNA and snRNAseq to characterize the transitional cellular states within the myogenic lineage.
The team will also aim to identify new biomarkers for DMD progression and to build on the new research axis using T cells to deliver therapeutic molecules, exploiting their natural ability to fuse to regenerating muscle fibers. This is an ambitious and original project which exploits the strengths of both teams and robust preliminary results which should deliver exciting results both at the fundamental and translational levels.

RECOMMENDATIONS TO THE TEAM

PhD students should be invited to join other labs as soon as possible rather than offering a postdoc position. All team members should be able to publish a first author article. The team should develop (or at least describe if they do it) interactions outside the lab, in particular now that they have a translational research axis. They could also look for European or international funding to further develop their networking opportunities.

Team 3 : Nervous System, embryogenesis and childhood Tumors

Name of the supervisor: Ms Valerie Castellani

THEMES OF THE TEAM

Research of the team focuses on mechanisms guiding cell and axon migration in the developing nervous system, examining molecular cues that orient cells and structure stereotyped movements during embryogenesis. In parallel, pediatric cancers of prenatal origin are studied to understand how developmental programs are reused or altered in neuroblastoma and medulloblastoma. Approaches combine chick embryo manipulation, imaging, single-cell transcriptomics, and analyses of human and mouse samples. Overall, the work links neurodevelopmental mechanisms with the early origins of childhood malignancies.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The previous evaluation of the research group was positive, noting their accomplishments. However, concerns were raised about the diversity of their projects, the risk of delayed publications, limited funding, and the need for greater technical and thematic integration. In response, the group abandoned the mouse model, unifying methodologies around the chick embryo, and refocused research on fewer developmental contexts, particularly neural crest lineages. This strengthened the coherence between neurodevelopment and cancer studies. To address recommendations on advanced technologies, the group implemented single-cell transcriptomics with support from the LabEx CORTEX platform and recruited a permanent bioinformatician. Concerns about funding and group cohesion were addressed by obtaining major grants, including an ERC Synergy grant and a Ligue Contre le Cancer team label. Finally, recommendations to reinforce clinical and technical links resulted in expanded collaborations with physicists and clinicians at several national hospitals.

TEAM WORKFORCE: IN PHYSICAL PEOPLE AS OF 31/12/2024

Catégories de personnel	Effectifs
Professeurs et assimilés	0
Maitres de conférences et assimilés	2
Directeurs de recherche et assimilés	2
Chargés de recherche et assimilés	1
Personnels d'appui à la recherche	5
Sous-total personnels permanents en activité	**10**
Enseignants-chercheurs et chercheurs non permanents et assimilés	3
Personnels non permanents d'appui à la recherche	0
Post-doctorants	0
Doctorants	3
Sous-total personnels non permanents en activité	**6**
Total personnels	**16**

EVALUATION OF THE TEAM

Overall assessment of the team

The team has achieved outstanding results in axon guidance and neurodevelopmental mechanisms of neuroblastoma and medulloblastoma, including a publication in *Cell*. The team produced fourteen papers (11 as last/corresponding author) and secured major funding including an ERC Synergy Grant. They supervised four postdocs and seven PhD students, and recruited one assistant professor. Their strong international visibility is evidenced by over twenty invited talks and scientific board involvement, with active technology transfer through patents and the Oncofactory spinoff.

Context-related strengths and opportunities

The team has developed an integrated research program that links neurodevelopmental mechanisms with pediatric cancers. Using imaging and single-cell transcriptomics, their work addresses topographic signaling, neuronal differentiation, axon patterning, and the organization of the enteric nervous system. Meanwhile, they applied embryonic transplantation approaches to neuroblastoma and medulloblastoma to identify metastatic gene programs, ligand-receptor interactions that influence cell migration, and subgroup-specific migration patterns. Translational developments include avian xenograft models for neuro-oncology applications, which enable analyses of therapeutic responses, resistance signatures, and drug targeting.
During the evaluation period, the team produced fourteen research papers and two reviews, with eleven papers led by team members as corresponding or last/co-last authors. Seven Ph.D. students and four postdoctoral researchers were trained, and one team member obtained a HDR. Two assistant professors are active contributors, including one recruited in 2023. The group secured more than twenty grants, including an ERC Synergy grant and a Ligue Contre le Cancer team label. Team members participated in international and national seminars, delivering around twenty invited talks, and several served on institutional bodies, including Inserm CSS4 (2022–2026).
The team promoted innovation by creating Oncofactory and filing or delivering five patents during the period. Exclusive licensing agreements are held by the European Research Biology Center (ERBC) since 2022. The Auvergne-Rhône-Alpes region supported collaborative academic–private projects. Overall, the team demonstrates substantial research productivity, strong external funding, and sustained engagement in academic, clinical, and industrial partnerships.
The team has anticipated the transition following the departure of a key researcher involved in pediatric cancer projects and has implemented appropriate measures, including knowledge transfer protocols and strategic recruitment, to ensure continuity and further development of this research axis.

Context-related weaknesses and risks

The team often experiences lengthy project completion times, especially for in vivo studies and research that relies on samples from patients with rare diseases, which can be challenging to align with the duration of a three-year Ph.D. program. The representation of international research staff remains limited, which could reduce the program's international appeal.

ANALYSIS OF THE TEAM'S TRAJECTORY

All proposed projects fall within the team's area of expertise and align with its outstanding scientific trajectory. The overall program is particularly promising, well-funded, and expected to be a major strength in the next contract period.
The team will continue advancing research on physiological neurodevelopment and pediatric diseases. They will focus on childhood nervous system cancers, such as neuroblastoma and medulloblastoma, as well as gastrointestinal motility disorders. Proposed projects include investigating topographic signaling in enteric nervous system development and assessing whether altered neuronal and axonal patterns contribute to pediatric motility defects, particularly through the role of ion channels in enteric circuit formation. Additionally, the team will examine neuroblastoma in the context of its embryogenesis, investigating malignant-healthy cell communication, etiological hypotheses associated with tumor heterogeneity and location, and the structure-encoded Unc5 interactome linked to aggressive neurodevelopmental tumors. Studies on medulloblastoma will further extend this developmental-oncology axis.

RECOMMENDATIONS TO THE TEAM

The team has demonstrated outstanding success in securing competitive funding, which has enabled high-quality scientific output. The team is encouraged to enhance its international dimension by actively recruiting international Ph.D. students and postdoctoral researchers, which would further elevate its global visibility and impact. While funding levels vary across research lines, strategic resource allocation will enable all research axes to develop fully and contribute to the team's continued excellence. As the team leader will assume directorship of the unit in the next contract period, ensuring strong support from permanent staff will be essential to balance administrative and scientific responsibilities.

Team 4 : Neurobiology and Aging of C. elegans

Name of the supervisor: Mr. Jean-Louis Bessereau

THEMES OF THE TEAM

The main goal of the team is to identify novel genes and mechanisms involved in the synaptic formation, regulation and function, using *C. elegans* as a model. They also develop a research axis on aging of the neuromuscular system. These studies rely on advance technologies such as genome editing, super-resolution imaging, electrophysiology, biochemistry and AI-based image analysis.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The Bessereau team answered the two recommendations. First, they attempted to publish more impactful articles, justifying a "modest" (by their words) number of publications, but with higher quality. However, they also mention that their systematic implementation of genome editing to get clearer results, and a general trend towards more fashionable research, limited their ability to target very high impact publications.
The second recommendation was to extend their work to mammalian systems which they did on culture systems in collaborations with expert groups at U. of Zurich and Collège de France, Paris. In line with the previous committee recommendation to attract good students, the team succeeded in attracting excellent students, although recruitment of postdocs remains more challenging.

TEAM WORKFORCE: IN PHYSICAL PEOPLE AS OF 31/12/2024

Catégories de personnel	Effectifs
Professeurs et assimilés	1
Maitres de conférences et assimilés	1
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	4
Personnels d'appui à la recherche	5
Sous-total personnels permanents en activité	**11**
Enseignants-chercheurs et chercheurs non permanents et assimilés	2
Personnels non permanents d'appui à la recherche	0
Post-doctorants	0
Doctorants	4
Sous-total personnels non permanents en activité	**6**
Total personnels	**17**

EVALUATION OF THE TEAM

Overall assessment of the team

The team has reached an outstanding scientific level and is internationally recognized as a leader in the field of synapse formation, maintenance and identity.

Context-related strengths and opportunities

The Bessereau team is composed of ± fifteen people, including six researchers and three technicians/engineers with permanent positions, as well as one postdoc and four PhD students. It has reached an outstanding level and is internationally recognized for its research and expertise on the neuromuscular junction organization in *C. elegans*. They are systematically using cutting-edge techniques such as genome editing to single cell analysis, proximity labelling, super-resolution imaging, optical manipulation and AI-driven image analysis. It has an outstanding level of funding with an ERC advanced grant to the PI, several ANR as well as funding from the AFM and FRM (total of 2,7M€). The team has a high number of researchers/ITA with permanent positions, allowing them to explore new topics such as aging and they have trained six PhD students and four postdocs. It is very well integrated into the local ecosystem and benefits from complementary expertise within MeLiS. They established several collaborations to transfer their results to mammalian models. The publication record is excellent, with nineteen peer-reviewed articles including eight primary articles (J Cell Biol 2021; PNAS, 2022 and 2024; Aging Cell 2022; Genetics 2021; Nat Comm 2020, Cells 2023; BioRxiv 2024), including seven signed as last author by senior members of the team who also obtained their own funding (ANR JCJC or PRC) demonstrating a strong support for senior members of the team.

Each researcher is involved into teaching, and team members have been invited to give > twenty lectures and seminars, including ± ten at the international (eg JMCx2, GRC, Columbia). JLB is also in charge of the CORTEX2.0 Labex, the imaging facility (2013-2024) and several other duties. The team outreach is outstanding, with a lot of interactions with the society through the Labex (Fête de la science, Femme et Sciences 2024) as well as with high school students and several interactions with society thanks to the research on aging.

Context-related weaknesses and risks

There are few weaknesses. The main one is the publication record of two PhD students and one postdoc who did not publish as first author (one had a preprint as first author in 2025). The team also encounters difficulties in hiring international postdocs. There is also a lack of expertise in computer science, which can constitute a problem in high throughput sequencing and AI-based image analysis, essential to the team projects. Discontinuity in TEM expertise may hinder progress on ultrastructural analysis. Finally, the coming end of LabEx support could affect long-term financial stability.

ANALYSIS OF THE TEAM'S TRAJECTORY

The trajectory of the team is outstanding. Over the next contract, the NeuraCel team will deepen its current research directions while fully exploiting the technological progress recently achieved in *C. elegans*.
The first axis builds on a BioRxiv manuscript and will characterize the role of in trans interactions of adhesion molecules in synapse formation. The second axis reflects the expertise of the team and will focus on the organization of the ECM at synapses. The third axis is very ambitious, aiming to decipher a molecular code of synaptogenesis; the goal is to systematically tag a few hundred proteins in order to identify novel synaptic components, and use them to investigate a possible code identifying specific synapses based on the combination of proteins localized at each synapse. Finally, they will continue to characterize neuromuscular aging. They also aim to transfer their results in other models through a very extensive collaboration network.

RECOMMENDATIONS TO THE TEAM

The team should maintain its strong focus on the molecular investigation of synapse formation, strengthening its internal expertise in bioinformatics and quantitative data analysis. The main recommendation would be to carefully prepare the team for the incoming retirement of the group leader.

Team 5 : Signaling Pathways and Regulators of K channels

Name of the supervisor: Mr. Thomas Boulin

THEMES OF THE TEAM

Potassium ion channels are essential for the function of neurons and muscles. The Boulin team uses *C. elegans* to study the localization and distribution of these channels, and the links between the function of these channels and diseases such as cardiac arrhythmias and neuronal disorders.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The team fully addressed all the comments. First, they published at an excellent level and obtained three new ANR grants including one as coordinator. They also welcomed several researchers with permanent positions, thus increasing the team size. Finally, they started a weekly informal lab meeting.

TEAM WORKFORCE: IN PHYSICAL PEOPLE AS OF 31/12/2024

Catégories de personnel	Effectifs
Professeurs et assimilés	0
Maitres de conférences et assimilés	1
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	1
Personnels d'appui à la recherche	1
Sous-total personnels permanents en activité	**3**
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels non permanents d'appui à la recherche	0
Post-doctorants	0
Doctorants	5
Sous-total personnels non permanents en activité	**5**
Total personnels	**8**

EVALUATION OF THE TEAM

Overall assessment of the team

The team has reached an excellent to outstanding level and has internationally recognized expertise in the field of potassium channel function and localization.

Context-related strengths and opportunities

The team is composed of ± ten people, including six researchers and one engineer; they trained or are training seven PhD students; the team is highly attractive with the recruitment of a CNRS AI and an MD who was a PhD student in the team; they also welcomed three researchers from other teams/units. The team received an ERC starting grant in 2013 and his team reached an excellent level and is recognised for its expertise on potassium-selective ion channels. They are using many cutting-edge techniques from genome editing to biochemistry,

electrophysiology and light microscopy. Since 2019 they received three ANR grants (one as coordinator, two as partner); they also coordinated an AFM grant and two smaller grants (e.g. Fondation Maladies Rares); they are partner in an MSCA Doctoral Network (total of 1.2M€). They published eleven articles including four as primary articles (Nat Comm 2024 on planar polarity in muscle cells; PNAS 2024 on constitutive permeability of potassium channels; Mol Gen Metab, 2021 on the use of *C elegans* to analyse rare variants implicated in human diseases; Nat Comm, 2019 on gating of potassium channels). The team productivity has progressed with six articles published in 2024, one of them signed by a permanent researcher of the team as last author, showing the willingness of the PI to promote the researchers of the team. The PhD students who graduated in 2020 and 2021 shared a co-first article.

The PI in engaged in teaching at the Master level (±17h/year) and an assistant professor teaches 200h/year. They gave ten talks/seminars, mostly at the national level including the scientific council of FC3R. The PI is member of several committee at the local and national level. The interaction with society includes meeting with primary school children and activities around an ANR. The group leader is the coordinator of a genome editing facility (SEGiCel) which is a very important asset for the french *C. elegans* community.

Context-related weaknesses and risks

The main identified risk is the workload of the PI who is co-leading all the axis of the team and becoming deputy director of the unit while also being in charge of a nationwide facility (SEGiCel). He therefore needs to carefully organize the team and the leadership on the different projects, while continuing promoting the independence of the team researchers.

The group leader should also focus on developing its international visibility using every possible mean (networking, participation to highly visible scientific meetings etc). Given the founding situation, they could also aim to recruit postdocs who could bring new expertise.

The team should also enhance its interactions with society (Declic, Pint of Science, Fête de la science etc).

ANALYSIS OF THE TEAM'S TRAJECTORY

The project of the team, organised around three axes, is excellent to outstanding. The first axis, well established in the team, is to characterise the planar polarity discovered in muscle cells with the subcellular organization of K* channels and the dystrophin-associated protein complex (DAPC); they propose to identify the downstream effectors of the Wnt- Ror-Dvl signaling pathway and two investigate the formation of distinct membrane domains; they already identified several candidates (e.g. PZLS-1/Pdznr). In the second axis they propose to continue the exploration of human genetic variants of K+ channels and regulatory proteins implicated in rare neurodevelopmental and cardiovascular diseases. Finaly, in the 3rd axis, they want to understand (1) how distinct neuronal classes establish their unique potassium channel expression profiles, (2) the mechanisms that maintain this electrical identity over time, and (3) whether it can be influenced by external perturbations or shaped by sex-specific differences. This last axis is very ambitious and original. With the new researchers with permanent positions, the team is very well positioned to achieve it but will need additional funding.

RECOMMENDATIONS TO THE TEAM

The team is now well established and should aim to train PhD students and to recruit postdocs with new expertises while carefully balancing the priorities between the three axes to prevent possible dispersion.

Team 6 : Synaptopathies et autoanticorps

Name of the supervisor: Mr. Jérôme Honnorat

THEMES OF THE TEAM

The SynatAc team (Synaptopathy and autoantibodies), focuses on rare autoimmune neurological diseases such as autoimmune encephalitis, peripheral neuropathies and paraneoplastic neurological syndromes, combining clinical and basic research. Using what is likely the largest clinical database and biobank worldwide for these conditions, the team aims to identify novel autoantibodies, dissect immune mechanisms, and understand how autoantibody- and T cell–mediated synaptopathies and microglia–neuron interactions drive neuroinflammation and neurodegeneration, with the goal of improving diagnosis, classification and treatment.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The previous report recommended maintaining the strong integration between clinical and scientific aspects and pursuing high-quality science. The team has kept this clinical–basic balance with outstanding science quality but recognizes that basic research remains slightly less connected to the very dynamic clinical projects and therefore plans to reinforce the fundamental component to better align mechanistic work with ongoing clinical research

TEAM WORKFORCE: IN PHYSICAL PEOPLE AS OF 31/12/2024

Catégories de personnel	Effectifs
Professeurs et assimilés	3
Maitres de conférences et assimilés	5
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	2
Personnels d'appui à la recherche	11
Sous-total personnels permanents en activité	**21**
Enseignants-chercheurs et chercheurs non permanents et assimilés	9
Personnels non permanents d'appui à la recherche	0
Post-doctorants	0
Doctorants	2
Sous-total personnels non permanents en activité	**11**
Total personnels	**32**

EVALUATION OF THE TEAM

Overall assessment of the team

The SynatAc team presents an outstanding overall profile, with a unique positioning at the interface of rare autoimmune neurological diseases, oncology and neuroimmunology, supported by one of the world's largest clinical databases and biobanks in this field. The team integrates both clinical and scientific activities with an outstanding publication record in high-impact journals and major grants. The team has also an outstanding international collaborative network, major involvement in MELiS and in medical transfer/patent valorisation in collaboration with the Hospital of Lyon.

Context-related strengths and opportunities

The SynatAc team benefits from a particularly favourable context, with a strong and well-structured association of clinical, translational and basic research around rare autoimmune neurological diseases. The integration of clinical reference centers with basic research groups provides a powerful framework for biomarker discovery and mechanistic studies, The team has built a unique, original clinico-biological cohort and biobank, enabling a fruitful valorisation policy for human disease biomarkers, supported by several national ANR, DHOS, Inca) and international funding, including a 7.3 M€ RHU4 France 2030 grant (4.4 M€ for the team) that anchors a highly ambitious translational program with industrial partnership. Publication record of the team is outstanding in volume and quality with more than 100 articles, including numerous original research papers and high-impact reviews over the period covered. A good number of publications are produced through international collaborations. The team has demonstrated excellent attractiveness for clinicians, by gathering around eight postdoctoral researchers and three PhD students, with twelve theses defended and about ten Master 2 students trained during the evaluation period supervise early-career scientists across both clinical and basic research components.

Context-related weaknesses and risks

Context-related weaknesses and risks are recognized by the team and include the difficulty of being fully recognized by all communities at the crossroads of neurosciences, oncology and immunology, which can limit visibility and career/readout opportunities despite the strong interdisciplinary positioning. The team's objectives rely on tight integration of basic and clinical research with a clear translational focus, making it challenging to recruit basic researchers whose profiles simultaneously match the expectations of several fundamental disciplines and who are ready to engage deeply with complex clinical questions, which may slow the consolidation of the basic arm of the program.

ANALYSIS OF THE TEAM'S TRAJECTORY

The SynatAc team shows a highly positive trajectory, evolving from an initial focus on clinical description of rare autoimmune neurological diseases to a mature, integrated clinico-biological program with strong national and international visibility. Since its creation and consolidation at MeLiS/INMG, the team has built one of the largest reference cohorts and biobanks worldwide, markedly increased its publication output in high-impact journals, and progressively strengthened its basic and translational components.
Over the evaluation period, the team has successfully attracted numerous postdocs and PhD students, obtained major competitive national and international funding and diversified its methodological toolbox from clinical phenotyping and biomarker discovery toward mechanistic studies in cellular and animal models. This trajectory illustrates a clear shift from being primarily a national reference center for diagnosis and care to becoming an internationally recognized leader in neuroimmunology and synaptopathies, with increasing capacity to translate basic discoveries into diagnostic tools and therapeutic strategies.

RECOMMENDATIONS TO THE TEAM

Maintaining the very strong integration between clinical and scientific activities while continuing to deliver research of the highest quality and impact.

Anticipating the departure of senior PU-PH to preserve strong interactions between the research unit and the clinics.

Team 7 : Zebrafish Neurogenetics and Behavior

Name of the supervisor: Mr. Owen Randlett

THEMES OF THE TEAM

The ZeNeB team focuses on visual behavior, particularly the O-bend response triggered by sudden dimming stimuli. Using Zebrafish, the team investigates three main axes: the mechanisms of habituation learning and adaptive changes in responsiveness; zebrafish models of movement disorders and their impact on neural circuits and behavior; and the neural mechanisms underlying directional decision-making based on prior experience. By combining genetic and pharmacological approaches, functional imaging, optogenetics, and quantitative behavioral analyses, ZeNeB aims to elucidate molecular and cellular targets, neural circuitry, and genotype-phenotype relationships, providing fundamental insights into adaptive behavior.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The team emerged from a 2019 ATIP-Avenir program, no previous recommendations.

TEAM WORKFORCE: IN PHYSICAL PEOPLE AS OF 31/12/2024

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

EVALUATION OF THE TEAM

Overall assessment of the team

ZeNeB is a young team from the 2019 ATIP-Avenir program that has rapidly built a strong scientific identity at the interface of behavioral neuroscience, genetics, and systems biology, using zebrafish. Despite its small size and post-Covid constraints, the team shows very good productivity, publishes in respected journals, and develops innovative tools. Its original studies on habituation and motor disorder models offer promising translational perspectives. Well integrated at MeLiS, the team would now benefit from strengthening its structure and international visibility.

Context-related strengths and opportunities

The ZeNeB team is a young and dynamic group that emerged from a 2019 ATIP-Avenir program. In a short time, it has built a strong and distinctive scientific identity at the intersection of behavioral neuroscience, genetics, and systems biology, using the zebrafish as its primary model. The team has developed a research program centered on visual behavior, adaptive plasticity, and the neural and molecular mechanisms of habituation learning. This conceptual focus provides a robust framework for addressing fundamental questions related to plasticity, sensory-motor integration, and decision-making.

ZeNeB has demonstrated a very good productivity in both scientific publications and technological innovation. Its work has appeared in very good impact journals such as *eLife* and *Nature Communications*. The development of methodological tools such as the pi_tailtrack system illustrates the team's strong creativity and technical expertise. Its capacity to model human movement disorders, including cerebellar ataxia and dystonia, also opens valuable translational perspectives and reinforces links between basic and clinical neuroscience.

ZeNeB occupies a clear and internationally visible niche in zebrafish behavioral neuroscience. Its integrated experimental platform, combining quantitative behavioral analysis, pharmacological and genetic screening, optogenetics, and whole-brain imaging, is particularly powerful given the team's modest size. The group benefits from a stimulating and supportive environment within the Lyon Neuroscience community, and its leadership is scientifically solid and internationally recognized, with active collaborations across Europe, North America, and Asia. The team is also strongly engaged in teaching activities (L1–M2), contributing to the visibility and attractiveness of neuroscience training in Lyon.

Looking forward, ZeNeB now faces the challenge of consolidating its structure and long-term visibility to secure stability and growth. Strengthening connections with other zebrafish groups at the national level, as well as with industrial partners interested in screening and technology transfer, represents an opportunity to further enhance its impact and extend the translational relevance of its work.

Context-related weaknesses and risks

The main limitation of the team lies in its small critical mass: with only 2.5 permanent researchers (including one MCF), its resilience and capacity for diversification remain constrained. The group also faces funding vulnerability, as it still depends largely on short-term and competitive grants such as the ATIP-Avenir program, which is nearing its end. The team noted that the relative scarcity of other non-mammalian model teams (especially zebrafish) in Lyon can make it somewhat isolated in methodological exchanges, which is surprising given the overall scientific workforce present in the city.

Administrative and linguistic challenges linked to the PI's non-native status add an extra layer of complexity in navigating the French academic system. Moreover, increasing regulatory constraints surrounding animal experimentation in Europe, as well as the ambitious scope of ongoing projects, pose long-term sustainability risks, particularly given the short duration of PhD and postdoctoral contracts.

ANALYSIS OF THE TEAM'S TRAJECTORY

Since its creation, ZeNeB has followed a coherent and productive development, resulting in a very good future trajectory. From two initial members in 2019, the group has grown to 4.5 members, including two PhD students, and has diversified its research while maintaining a unified conceptual core. After an initial phase of tool development and methodological validation, the team is now delivering original mechanistic insights into learning and adaptive behavior.

The integration of molecular genetics, pharmacology, and circuit neuroscience in a small vertebrate model remains one of the distinctive strengths of ZeNeB. The PI, has established a strong international reputation within the zebrafish community, demonstrating scientific leadership and strong communication skills. Collaborations with clinical researchers, particularly in modeling ataxia and dystonia, together with the development of open-source tools, reflect a balanced strategy combining fundamental and applied research.

Looking ahead, priorities include strengthening human resources through the recruitment of permanent staff, securing stable long-term funding, and increasing participation in national and European collaborative programs. Supported by a very good research program and sustained institutional backing, ZeNeB is very well positioned to become a reference in the study of adaptive behavior and neural plasticity in vertebrate models

RECOMMENDATIONS TO THE TEAM

To consolidate its achievements, the team should prioritize recruiting at least one permanent researcher or engineer to ensure continuity and technical stability. A key challenge will be transitioning from startup and ATIP-

Avenir funding to longer-term national or European grants (e.g., ANR PRC, ERC Consolidator). Stronger local integration through closer collaboration with Lyon neuroscience teams, particularly in neurophysiology and modeling, would enhance visibility and methodological exchange.

ZeNeB would also benefit from expanding translational partnerships with clinical and pharmaceutical collaborators to reinforce its applied dimension. Maintaining a balanced strategy across fundamental, technological, and translational research will be essential to avoid overextending resources. Greater participation in international conferences, zebrafish consortia, and open science initiatives would further raise the team's profile. Anticipating regulatory and ethical developments in animal research through automation and data-driven behavioral assays will support long-term adaptability.

Overall, ZeNeB is a scientifically strong and promising team that has made very good progress in a short time. With strategic consolidation of its human and financial base, it is well positioned to make major contributions to the understanding of adaptive neural processes and their dysfunctions.

Team 8 : Embryologie humaine, normale et pathologique

Name of the supervisor: Mr. Alain Chedotal

THEMES OF THE TEAM

The 3D-HUMAN platform is a newly created platform which aims to develop and apply advanced 3D imaging techniques to better understand the human development. Its main goal is to generate high-resolution anatomical and molecular maps of human embryos and organs using cutting-edge techniques, including advanced labelling, light-sheet microscopy and optical clearing. It serves as a collaborative hub for the Lyon scientific and medical community supporting research activities at the interface between developmental biology, imaging technologies and clinics.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

None as the team was just created in 2023.

TEAM WORKFORCE: IN PHYSICAL PEOPLE AS OF 31/12/2024

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

EVALUATION OF THE TEAM

Overall assessment of the team

The 3D-HUMAN platform is a highly promising addition to MeLiS, combining advanced imaging technologies with internationally recognized expertise in human developmental biology. Led by Alain Chédotal, it occupies a strategic position between fundamental embryology and clinical research. Despite challenges such as limited permanent staff and the need for stable on-site leadership and long-term funding, the platform's trajectory is outstanding, clear, ambitious, and strongly supported.

Context-related strengths and opportunities

The 3D-HUMAN platform is built on a very strong scientific and institutional foundation. It is led by a very famous researcher in human developmental neurobiology and 3D imaging, and benefits from internationally

recognized expertise and a long track record of methodological innovation. Locally, the platform benefits from long-standing 3D imaging expertise within MeLiS teams, which ensures the rapid adoption of the platform's methodologies. A strong institutional support from the LabEx Cortex has enabled the acquisition of cutting-edge equipment such as the BLAZE ultramicroscope, providing the Lyon research community with a unique resource to explore developmental systems and to generate anatomical data. Together, these elements provide outstanding scientific and technological opportunities for the development of the platform within MeLiS.

Context-related weaknesses and risks

Several risks may affect 3D-HUMAN platform's long-term stability. The generation of very large 3D datasets through optical clearing and light-sheet microscopy requires robust computational infrastructure and specialized image-analysis expertise, which may not yet be secured. Despite the recent recruitment of a new MCU, the platform still depends on a limited number of permanent staff, a situation that is particularly fragile for a highly technological facility requiring continuous technical expertise, maintenance, and methodological development. This may affect service continuity and the capacity to support multiple collaborative projects simultaneously. In addition, the PI is not fully based in Lyon, as he maintains his laboratory at the Institut de la Vision in Paris, which may complicate daily management and on-site scientific leadership of the platform.

ANALYSIS OF THE TEAM'S TRAJECTORY

Over the next years, the 3D-HUMAN platform will develop an ambitious research program on human developmental biology, strengthened by the transfer of the PI's human embryology activities from Paris to Lyon. The platform will mainly focus on human embryology and primarily the nervous system, by combining advanced 3D imaging and labeling, tissue clearing and multi-omics approaches. Strong interactions with several MeLiS teams will play a central role in the methodological development of the platform, thanks to their longstanding expertise in advanced microscopy. Located within the Foetopathology Department, the platform will also expand translational activities in fetal pathology and oncology, and contribute to education and to national efforts in human embryo research. Although securing permanent staff and stable long-term funding remains a challenge, the platform is well positioned for significant scientific expansion through new recruitments and upcoming grant opportunities. Overall, the trajectory of the 3D-HUMAN platform is outstanding, combining a clear long-term vision, strong methodological development and clinical integration and exceptional national and international positioning.

RECOMMENDATIONS TO THE TEAM

The 3D-HUMAN platform needs to consolidate its development by securing a stable core of permanent staff, which is essential for a highly technological facility that requires continuous technical and long-term expertise. Strengthening local recruitment will be critical to ensure platform continuity, especially as the PI is not yet fully based in Lyon and continues to maintain a laboratory in Paris. Given the scale of the projects and their computational demands, the team is encouraged to develop a clear strategy for data management, high-performance computation and AI-based image analysis. Finally, it will be essential to secure long-term funding through national grants, European programs and institutional support, to maintain technological excellence and support ongoing translational collaborations with the hospital departments.

Team 9 : Cerebellar Development

Name of the supervisor: Mr. Ludovic Telley

THEMES OF THE TEAM

Cerebellar developmental programs to neurodevelopmental disorders and brain tumors.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

Not applicable, as this is a new team.

TEAM WORKFORCE: IN PHYSICAL PEOPLE AS OF 31/12/2024

N/A

EVALUATION OF THE TEAM

Overall assessment of the team

As the team has been newly created, only its projected trajectory was analyzed. Overall, the committee acknowledges the outstanding quality of the research project and anticipates a remarkable development and rapid integration of the team within MeLiS in the short term.

Context-related strengths and opportunities

Not applicable

Context-related weaknesses and risks

Not applicable

ANALYSIS OF THE TEAM'S TRAJECTORY

The PI has developed an outstanding trajectory marked by exceptional scientific creativity and productivity during his PhD and postdoctoral training. His doctoral work on cerebellar development led to high-quality publications and introduced him early to developmental neurobiology. His postdoctoral research was outstanding, producing landmark studies in Nature, Science and Cell that reshaped current understanding of transcriptional regulation and lineage-dependent mechanisms generating neuronal diversity. These contributions remain highly cited and have helped establish experimental and conceptual frameworks now widely used in the field.

As a group leader at UNIL (2018–2024), he secured major competitive funding, including an ERC Starting Grant, and developed ambitious research on cerebellar cell-type diversity. Thanks to his advanced bioinformatics and data-integration skills, the PI contributed to a major *Nature* publication in 2023, a very recently accepted Nature Communications publication and a manuscript under review at Nature Neuroscience, illustrating the breadth of his collaborative network and the recognized value of his analytical and conceptual expertise. Several manuscripts directly stemming from his ERC project and including team members as leading authors (and not only the PIs) are currently under submission, reflecting the ability of the team to generate independent discoveries beyond collaborative or data-centric contributions. Overall, while the publication record from his Lausanne team is still developing, the combination of a high-impact Nature article, collaborative preprints driven by the PI's expertise, and the ongoing submission of ERC-derived studies collectively indicate a positive trajectory and a research program with significant upcoming potential.

Since joining the MELIS unit in late 2024, he has launched a new project aiming to connect cerebellar developmental programs to neurodevelopmental disorders and brain tumors. The project is scientifically strong, built around a 4D atlas of cerebellar development integrating lineage, transcriptomic, epigenomic and spatial

information. This resource would provide substantial value to the community and serves as the foundation for predictive gene identification and cross-analysis with human genetic datasets. The complementary axis focused on gene perturbation and functional genomics is coherent but depends heavily on successful implementation of the atlas and on significant human and technical resources, which remain to be secured.

Overall, the trajectory shows very high scientific potential and internationally recognized expertise but also highlights the need to consolidate team-level productivity, establish robust mentoring capacity, and secure appropriate resources to deliver the ambitious developmental and disease-oriented goals proposed.

RECOMMENDATIONS TO THE TEAM

The committee encourages the PI to prioritize the consolidation of his new team at MELIS by recruiting and supervising doctoral students, postdoctoral researchers and technical staff, ensuring that expertise in both experimental and computational approaches is represented. Strengthening project management and defining clear objectives among team members will be essential for generating primary publications originating from the group and for fostering a sustainable research dynamic.

Given the central role of the 4D cerebellar atlas in the scientific plan, the committee encourages the team to capitalize on this highly innovative framework by articulating a clear roadmap to ensure that the atlas becomes not only a landmark resource but also a powerful springboard for generating new biological insights.

The committee also values the team's strong collaborative profile and recommends maintaining this momentum while progressively strengthening internally driven biological questions, allowing the group to fully exploit its conceptual strengths and consolidate its own scientific identity. Finally, the committee encourages the PI to pursue his effort in securing adequate funding adapted to the scale of the project and to building long-term collaborations that effectively integrate the planned disease-oriented investigations.

Team 10 : Mechanisms and therapies for neuromuscular diseases

Name of the supervisor: Ms Pascale Bomont

THEMES OF THE TEAM

Team 10 focuses on neurofilament biology and the development of therapeutic strategies for neuromuscular diseases, particularly giant axonal neuropathy. Their research integrates fundamental studies on intermediate filament architecture with translational approaches combining gene therapy and pharmacological interventions, supported by robust animal models.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

No previous recommendations, as this is a new team.

TEAM WORKFORCE: IN PHYSICAL PEOPLE AS OF 31/12/2024

N/A

EVALUATION OF THE TEAM

Overall assessment of the team

Given that the team applied to join Melis for the upcoming contract, the committee has chosen to focus its review solely on the team's trajectory.

Context-related strengths and opportunities

Not applicable

Context-related weaknesses and risks

Not applicable

ANALYSIS OF THE TEAM'S TRAJECTORY

The team has established an outstanding, ambitious, and coherent research trajectory that is highly complementary to the MELIS unit's project and will create outstanding synergies with the host institution. Focused on deciphering neurofilament biology and developing therapeutic strategies for neuromuscular diseases, particularly giant axonal neuropathy (GAN), the team has identified a neurodevelopmental signature in GAN and aims to further explore its relevance in human pathology. The neurofilament architecture project aligns exceptionally well with the team's expertise and promises to reveal fundamental mechanisms regulating intermediate filaments across tissues. The development of a robust GAN knock-in mouse model has enabled a translational program combining gene therapy and small-molecule strategies, supported by solid preliminary data from zebrafish and mouse studies.

The team demonstrates outstanding capacity in securing competitive funding, with the GAN therapy program initiated in 2021 providing a solid foundation for the next contract period and sustained development of the gene therapy platform supported by AFM. Strong industrial partnerships and active involvement in outreach and technology transfer further enhance the team's impact. Several manuscripts are in preparation and one patent is under discussion, highlighting ongoing productivity. The team, currently comprising ten members including two permanent staff, plans to recruit one or two permanent researchers in the next contract, which would strengthen long-term stability and capacity.

RECOMMENDATIONS TO THE TEAM

The team's outstanding research program positions it ideally for its integration into the MELIS unit. The planned retention of current laboratory space will facilitate the development of strong scientific and institutional coherence while maintaining operational continuity. The team is encouraged to continue its exemplary engagement with the research community, particularly through its leadership role in establishing the shared zebrafish facility, which will serve as a valuable resource and foster collaborative opportunities. The team has demonstrated exceptional effectiveness in securing competitive funding and is well-positioned to maintain this momentum, which will be essential to sustain its ambitious and high-impact research trajectory. The proposed program is outstanding and promises to make major contributions to both fundamental neurobiology and translational medicine in the next contract period.

Team 11:	Molecular Mechanisms of Motor Neuron Development and Degeneration
Name of the supervisor:	Mr. Paschalis Kratsios

THEMES OF THE TEAM

Molecular Mechanisms of Motor Neuron Development and Degeneration

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

No previous recommendations, as this is a new team.

TEAM WORKFORCE: IN PHYSICAL PEOPLE AS OF 31/12/2024

N/A

EVALUATION OF THE TEAM

Overall assessment of the team

The team will be an asset for MeLiS, combining scientific excellence, strong international visibility, and a consistently upward trajectory. It has established clear leadership in motor neuron biology while expanding into neurodegenerative disease research with remarkable coherence. Its outstanding productivity, funding, and community impact reflect a mature, competitive environment fully aligned with MeLiS's ambitions. The team is well positioned to deliver sustained high-impact research and play a central role in MeLiS's future.

Context-related strengths and opportunities

Not applicable: team not yet established in MeLis

Context-related weaknesses and risks

Not applicable: team not yet established in MeLis

ANALYSIS OF THE TEAM'S TRAJECTORY

This team has followed a remarkable and consistently upward trajectory, driven by an outstanding research project combining conceptual originality, methodological rigor, and strong productivity. The group has established itself as an international leader in the study of transcriptional programs controlling motor neuron identity across development and adulthood. Its work on terminal selectors, temporal modularity, and persistent Hox functions has had a major impact on the field, while the recent expansion toward neurodegenerative disease mechanisms (ALS/FTD) demonstrates an ability to evolve scientifically without losing coherence. The integration of multiple model systems (C. elegans, mouse, human iPSC-derived neurons), the creation of widely used community resources, and the establishment of the Center for Motor Neuron Disease reflect a mature, influential, and highly visible research environment. The team is supported by numerous funding sources, including an ANR Chair of Excellence, which underlines both its scientific recognition and its strong potential for continued high-impact research. Overall, the team's trajectory is outstanding and positions it for sustained leadership at the interface of developmental and degenerative neuroscience.

RECOMMENDATIONS TO THE TEAM

To fully capitalize on this outstanding project, the team should now focus on consolidating and structuring its growth. Clarifying strategic priorities will help balance the breadth of developmental and degenerative research while maintaining conceptual unity. Strengthening human resources, particularly through the recruitment of postdoctoral researchers and technical staff, will be essential to support the ambitious multi-model program. Further investment in human-relevant systems, such as motor neuron organoids and advanced iPSC-based approaches, would reinforce the translational impact. The team is encouraged to continue promoting its open-science resources and to deepen synergies with MeLiS groups in genomics, epigenetics, and structural biology. Attention should also be paid to managing the transition and coordination between the US and France laboratories, as this could be highly demanding in terms of time and organization. Finally, anticipating technological and organizational risks through diversification of platforms and advanced training will ensure long-term stability and maximize the scientific returns of this outstanding research program.

CONDUCT OF THE INTERVIEWS

DATES

Beginning: 17 december 2025 at 08:45

Ending: 18 december 2025 at 16:15

Interview conducted: on-site

PROGRAMME OF THE INTERVIEWS

December 17
08:45 - 09:00 Introduction – Scientific Advisory Committee
09:00 - 09:55 Director's Presentation
09:55 - 10:15 Coffee Break – Debriefing
10:15 - 10:55 Benedicte Durand (ACDC)
10:55 - 11:35 Christophe Marcelle / Fabien Legrand (MyoDevRep)
11:35 - 12:15 Valérie Castellani (NEST)
12:15 - 13:30 Lunch Break – Debriefing
13:30 - 14:10 Jean-Louis Bessereau (NeuraCel)
14:10 - 14:50 Thomas Boulin (SPARK)
14:50 - 15:25 Jérôme Honnorat (SynatAc)
15:25 - 15:55 Coffee Break – Debriefing
15:55 - 16:30 Pascalis Kratsios (Chair of Excellence)
16:30 - 17:05 Alain Chédotal (3D HUMAN)
17:05 - 18:30 Laboratory Visit

December 18
08:45 - 09:15 Pascale Bomont (New Research Team)
09:30 - 10:00 Ludovic Telley (New Research Team)
10:00 - 10:35 Owen Randlett (ZeNeB)
11:05 - 12:05 Meeting with Researchers / Professors, Technical Staff, PhD Students and Postdoctoral Researchers
12:05 - 13:30 Lunch Break – Debriefing
13:30 - 14:00 Meeting with Institutional Representatives
14:00 - 14:15 Debriefing
14:15 - 15:15 Meeting with the Director – Preparation of the Director's Report
15:15 - 16:15 Committee Closed Session – Report Preparation

GENERAL OBSERVATIONS OF THE SUPERVISORS

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19 rue Poissonnière
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Réf. : ***Observations de portée générale sur le rapport d'évaluation DER-PUR270026032 - MeLiS - Mécanismes en sciences intégratives du vivant***

Villeurbanne, le 9 mars 2026

Madame, Monsieur,

Je vous remercie de m'avoir transmis le pré-rapport d'évaluation de l'UMR5284/U1314 **Mécanismes en sciences intégratives du vivant – MeLiS.**

Je tiens à souligner la très grande qualité du travail réalisé par les membres du comité d'évaluation.

Après lecture attentive et analyse du document, je vous précise que ce rapport n'appelle pas d'observation de la part de l'Université Claude Bernard Lyon1.

Je vous prie de croire, Madame, Monsieur, en l'expression de mes sentiments les meilleurs.

Université Claude Bernard Lyon 1
Pour le Président et par délégation

Le Vice-Président Recherche
Arnaud BRIOUDE

UNIVERSITE CLAUDE BERNARD LYON I

Annexe : retour de l'UMR5284/U1314 MeLiS sur le rapport d'évaluation du laboratoire.

Mechanisms in integrated Life Sciences

UMR 5284 U1314

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HCERES
Département Recherche

Lyon, le 6 mars 2026

Objet. Observations générales sur le rapport d'évaluation DER-PUR270026032 - Melis

Chers et chères Collègues,

Nous souhaitons remercier vivement le Comité de Visite et l'HCERES pour la richesse et la qualité du rapport qui nous a été transmis.

Nous sommes particulièrement ravis de l'évaluation extrêmement positive de l'unité MeLiS et de ses équipes. Nous sommes aussi reconnaissants des critiques constructives et des recommandations formulées qui nous seront très utiles à court et moyen terme.

Au nom de l'ensemble des personnels de MeLiS je remercie les collègues qui ont donné de leur temps pour cette évaluation, ainsi que l'HCERES qui a organisé et mené à bien l'ensemble du processus.

Cordialement,

Jean-Louis Bessereau, MD, PhD

Evaluation of universities and schools
Evaluation of research units
Evaluation of the academic formations
Evaluation of the national research organisms
Evaluation and International accreditation

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