

EVALUATION REPORT ON THE UNIT:

INM - Institut des Neurosciences de Montpellier :
déficits sensoriels et moteurs

UNDER THE SUPERVISION OF INSTITUTIONS AND RESEARCH BODIES:

Université de Montpellier

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

EVALUATION CAMPAIGN 2025-2026
GROUP A

Report published on May, 20 2026



On behalf of the committee of experts:

Frédéric Simonin, Chairperson of the committee

For Hcéres:

Coralie Chevallier, President

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: Institut des Neurosciences de Montpellier : déficits sensoriels et moteurs
- Acronym: INM
- Label and number: UMR 1298
- Number of teams: 8
- Composition of the executive team: Mr Sylvain Lehmann

SCIENTIFIC PANELS OF THE UNIT

SVE Sciences du vivant et environnement
SVE5 Neurosciences et troubles du système nerveux

THEMES OF THE UNIT

The Institute for Neurosciences of Montpellier (INM) main themes are in sensory and motor neuroscience as well as neurodegeneration and has now expanded its research in Neuroscience to central integration, neurodegenerative diseases, epidemiology and clinical research. During the evaluation period, the INM had 8 teams working on Audition, corticogenesis, motoneurons, cognition and implication of environment, eye, proteinopathies, sensation and vision.

HISTORIC AND GEOGRAPHICAL LOCATION OF THE UNIT

The INM is located inside the St Eloi Hospital campus, part of the Montpellier University Hospital. The INM integrates itself in the University Biology Health Scientific Department (DSBS) and its Neurosciences axis. The INM also shares facilities with another institute, the Institute for Regenerative Medicine and Biotherapy (IRMB), an institute which host an Inserm unit developing biotherapies. The IRMB is using the INM animal facilities as well as technical platforms. The clinical teams involved in INM translational research [from ENT (Ear, Nose, and Throat), ophthalmology, neurology or neuroradiology]] are all located in the Gui de Chauliac hospital which is at a walking distance from the Institute.

UNIT RESEARCH ENVIRONMENT

INM relates to the CHU of Montpellier (and the CHU of Nîmes through common university staff), which is essential for the development of translational and clinical research projects involving both biology and medical teams. One of INM's ambition is to develop translational projects in Neuroscience. The INM considers this link important for its visibility, notably to attract support by funding agencies, foundations and patient associations. The latter relationship with patient associations in the neuro-sensory, motor and neurodegenerative fields is considered by the INM as a unique characteristic. INM researchers are involved in two "Long-Term Thematic Projects" (PTLs) which fund targeted scientific topics over a five-year period: PTL HiLight (Life Imaging) and PTL Cosmic (Complex Organoid Systems with Multifaceted Interactions). These PTL are part of the excellence iSITE project led by the UM that gathers the forces of 19 institutions (including Inserm, CNRS and the CHU of Montpellier), towards a common vision: create in Montpellier a research-intensive thematic university that will be internationally recognized for its impact in the fields of agriculture, environment and health. Several teams of the INM also participate to the European Center of Excellence in Neurodegeneration of Montpellier (CoEN) and the Center of Excellence on Autism and Neurodevelopmental Disorders (CeAND). The aim of these centers is to promote the emergence of multi-disciplinary projects bringing together basic, preclinical, clinical, epidemiological and social sciences on neurodegenerative diseases (Alzheimer's, Parkinson's disease, multiple sclerosis or amyotrophic lateral sclerosis) and Neurodevelopmental Disorders.

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

Catégories de personnel	Effectifs
Professeurs et assimilés	19
Maitres de conférences et assimilés	12
Directeurs de recherche et assimilés	10
Chargés de recherche et assimilés	12
Personnels d'appui à la recherche	42
Praticien hospitalier	20
Total Sous-total personnels permanents en activité	115

Enseignants-chercheurs et chercheurs non permanents et assimilés	9
Personnels non permanents d'appui à la recherche	22
Post-doctorants	9
Doctorants	38
Total Sous-total personnels non permanents en activité	78
Total personnels	193

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
U Montpellier	29	2	9
Inserm	0	15	25
Autres	2	5	28
Total personnels	31	22	62

GLOBAL ASSESSMENT

The Institute for Neurosciences of Montpellier (INM) demonstrates an **excellent** overall performance in the field of sensory and motor neuroscience as well as neurodegeneration. The unit combines high scientific productivity, strong impact, and a research environment adapted to its ambitious translational/clinical research projects. The involvement of teams in the European Center of Excellence in Neurodegeneration of Montpellier (CoEN) and the Center of Excellence on Autism and Neurodevelopmental Disorders (CeAND) also illustrates the desire to ensure that the research project meets the highest standards of excellence. The unit shows remarkable competitiveness and financial autonomy, with an impressive €42 million for the 2019-2024 period from national and European funding (excluding recurring allocations). The scientific output of the INM is of an excellent to outstanding standard with more than 420 publications recorded during the evaluation period. It is noteworthy that the majority of research teams have produced independent and collaborative publications in internationally recognized, peer-reviewed, specialized and generalist journals such as *Nature Communications*, *Journal of Clinical Investigation*, *New England Journal of Medicine*, *The Lancet*, *Proceedings of the National Academy of Sciences USA*, *ACS Central Science*, and *Molecular Therapy*. Another strength of the INM relies on its scientific networking. Researchers of INM are actively engaged in numerous national and international scientific societies and collaborative networks, including the CosySpeech consortium (ERA-Net Neuron), the International Society of Developmental Neuroscience and European initiatives such as COST Action (Aniridia-Net). Researchers also occupy leadership positions (president, vice-president, secretary-general) in several major associations and committees (e.g. ARSLA, AFM), contributing to the institute's scientific reputation and influence. These aspects attest to INM's strong international profile, visibility and makes the unit attractive to young researchers. Indeed, over the evaluation period, approximately 90 PhD students were enrolled and they significantly contributed to INM's long-term excellence. Finally, the INM demonstrates strong socioeconomic integration through European networks, hospital collaborations and advisory board participation. Innovation capacity is evidenced by start-up creation reflecting effective knowledge transfer. Public engagement occurs through conferences, outreach activities and patient association partnerships.

DETAILS OF THE EVALUATION OF THE UNIT

A - CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The previous report raised several avenues for improvement. The first one concerned the "scientific production and activities". Regarding this specific point, it appears that the recommendations have generally been considered, with high participation of young researchers to national and international meetings, almost 100 publications in (very) well ranked journals, and better credit to university on the publications.

The previous report also highlighted issues concerning "organisation and life". In agreement with the recommendations, the previous direction has improved a number of points but there are still improvements to be made. There are now a Health & Safety and Quality working group, and a permanent staff for the animal facility, and communication with the technicians and engineers has been improved. Concerning the scientific strategy, although the Hcéres project has been made available to all staff via the unit's intranet, communication, both top-down and bottom-up communication should be further strengthened across all categories of personnel. Particular attention should be given not only to the dissemination of the strategic framework but also to issues related to career progression and the allocation of bonuses. Furthermore, given that the animal facility manager is approaching retirement, anticipatory measures for succession planning should be implemented without delay.

Finally, remarks were made about "scientific strategy and projects". The efforts to renovate space and labs are noticeable, and the previous direction has set up various initiatives to improve effective collaborations between groups (including the Synergy call) and improved social media visibility.

B - EVALUATION AREAS

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

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

The unit has set itself ambitious and coherent scientific objectives, perfectly aligned with national and local strategic priorities, articulated around a well-structured organization combining eight research teams and eight technological platforms. Its scientific positioning covers a broad spectrum, ranging from fundamental neuroscience to clinical and translational research. The strong translational dynamic is reflected in the sustained involvement of hospitals. Human, technical and financial resources are generally well suited to these objectives, with a high level of funding obtained through competitive calls for projects, demonstrating the unit's scientific excellence. The critical mass of engineers and technicians, and their distribution across shared platforms, is a major asset for the quality and sustainability of research. Governance practices comply with supervisory requirements and are supported by collegial bodies, ethical oversight and proactive initiatives in gender equality and environmental responsibility. While challenges remain in terms of internal consistency, postdoctoral recruitment and communication practices, the unit shows a clear ability to address these challenges, justifying an overall rating of **very good to excellent**.

1/ The unit has set itself relevant scientific objectives and is organized accordingly.

2/ The unit has resources adapted to its scientific objectives, profile of activities and research environment and mobilizes them.

3/ The unit has premises, equipment and technical skills adapted to its scientific policy and research objects.

4/ The unit's practices comply with the rules and guidelines set by its supervisory bodies in terms of human resources management, safety, environment and data protection as well as scientific assets.

Context-related strengths and opportunities for the four references above

1/ The unit has set itself relevant scientific objectives and is organized accordingly.

The INM's objectives align with the guidelines established by the national and local supervisory authorities. It brings together eight research teams and eight service and technological platforms. Topics covered include pure fundamental research projects (e.g. the corticogenesis team), projects focusing on sensory systems at the physiological and/or pathophysiological level (e.g. the hearing, eye, sensation and vision teams), and projects focusing on neurodegenerative and psychiatric disorders (e.g. the motor neuron, proteinopathies and neuropeptides teams). These different themes, combined with diverse, complementary and, in some cases, cutting-edge methodologies, also enable numerous translational research projects to be carried out. Evidence of this can be seen in the award of seven Cifre grants, six partnerships with companies, and the creation of two start-ups (Dolinnov Biotech/Horama). The focus on translational research is supported by the arrival of 21 hospital staff (compared to 8 in 2019) and the centre's close relationship with Montpellier University Hospital, which is located nearby.

2/ The unit has resources adapted to its scientific objectives, profile of activities and research environment and mobilizes them.

During the previous contract, the institute relied on staff of 190 collaborators, including 29 permanent researchers, 32 lecturers or professors (including MCU-PH and PU-PH) and 13 postdoc fellowships. The institute also benefited from the support of 61 technicians/engineers (22 CDD) and were able to train 89 PhD student (defended or ongoing thesis). Despite the constraints on obtaining permanent research positions, the center has succeeded in recruiting permanent staff (2 research associate and 2 full-time researcher).

The financial resources through competitive national and international funding represent more than 90% of obtained fund with an impressive 42 M€ budget for the 2019-2024 period. The high level of funding obtained from competitive calls for proposals is notable with 266 contractual financing, particularly for the Audition and Protéinopathies teams (12 285 k€ and 5 310 k€ respectively). Sixty-five per cent of own resources come from funding from charitable organisations (10 442 k€ from 50 associations), national contracts (8 339 k€ mainly from the ANR) and European contracts (3 012 k€, mainly H2020 and ERA-NET) or international contracts (1,204 k€). Resources from successes within the framework of the PIA (15%) or local authority structural plans (12%) supplement the unit's budget by 8 339 k€ and 4 352 k€ respectively. Finally, partnerships with the socio-economic environment generated 2 781 k€ over the period 2019-2024.

3/ The unit has premises, equipment and technical skills adapted to its scientific policy and research objects.

The INM has a researcher/PAR ratio conducive to high-quality research (71 researchers/96 PAR according to the DAE). The institute has set up eight service and technology platforms, three of which are part of the Montpellier Biocampus UAR. The organisation of shared equipment and platforms is supervised by a coordinator. The equipment pool meets the needs of the eight teams that make up the INM, and the optimisation of engineering and technical human resources is ensured by the significant number of staff whose activities are associated with shared platforms and services. As a result, nearly half of the PAR workforce is assigned 50% or more to shared platforms and services.

4/ The unit's practices comply with the rules and guidelines set by its supervisory bodies in terms of human resources management, safety, environment and data protection as well as scientific assets.

The INM has an executive committee, a unit council and has set up a general assembly, which allows for collegial decision-making and for decisions to be shared and explained at all levels. An Ethics, Parity and Integrity Committee (CEPI) has been set up within the institute to deal with issues and monitor human resources regulations relating to gender equality and discrimination. The overall gender distribution is balanced.

The unit recently established a Green INM Committee to assess how to minimise its environmental impact, promote recycling, reduce its carbon footprint and save energy.

Context-related weaknesses and risks for the four references above

It should be noted that during the previous two contracts, the centre was rather unstable in terms of teams, with numerous internal and external changes. The same will be true of the next contract. This instability has probably discouraged interaction between the different teams, and it seems that the centre's coherence exists more through technological platforms than cross-disciplinary projects (of which there are a few). Moreover, in view of the size of the center, the number of postdoctoral fellowships appears to be low. This is surprising according to the high level of funding of the center. This could of course reflect a strategy of the center to privilege technician/engineer or PhD student recruitment but also a lack of attractiveness. Despite the establishment of councils and committees within the Unit, internal communication must be improved especially to address psychological risks. Despite a good gender ratio, one area of concern is the number of team leader positions held by women.

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

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

The INM demonstrates **excellent to outstanding** scientific performance, producing high-quality research widely recognized in leading international journals. Its research spans fundamental to applied neuroscience, reflecting a strong multidisciplinary approach. INM's international reputation is reinforced by active participation in prestigious networks and leadership roles within major scientific organizations. The institute's training programs attracted around 90 PhD students from France and abroad, confirming its appeal to emerging scientists. With approximately €35 million in external funding, INM maintained strong financial competitiveness. Ethical standards and open science practices were rigorously upheld, ensuring transparency, integrity, and compliance across all research activities.

- 1/ The unit is recognized for its scientific achievements that meet quality criteria.*
- 2/ The research activities of the unit result in quality scientific production.*
- 3/ The unit participates in the coordination and management of its community.*
- 4/ The unit's scientific production respects the principles of scientific integrity, ethics and open science. It complies with the guidelines applicable in this field.*

Context-related strengths and opportunities for the four references above

The scientific output of the INM is of an excellent to outstanding standard, both in terms of volume and quality. The majority of research teams have produced independent and collaborative publications in internationally recognized, high-impact journals such as *Nature Communications*, *Journal of Clinical Investigation*, *New England Journal of Medicine*, *The Lancet*, *Proceedings of the National Academy of Sciences USA*, *ACS Central Science*, and *Molecular Therapy*. Several of these publications have been cited over 100 times, indicating strong international visibility and recognition of the institute's scientific contributions. The overall productivity is remarkable, with 656 publications recorded during the evaluation period. The quality of these outputs is reflected by the fact that 60% are ranked in the SIGAP A and B categories. Notably, 57% of the publications are led by INM researchers, underscoring the central role of INM scientists in developing original, high-impact research. The involvement of PhD candidates, postdoctoral researchers, and technical staff members in scientific publications further highlights the institute's commitment to inclusive research engagement and capacity building.

The scope of INM's publications covers a broad range of fundamental, methodological, and applied neuroscience topics, supporting the unit's multidisciplinary approach and reinforcing the relevance of its work across several domains of neuroscience.

Another strength, relies on the attractiveness of the unit and its Scientific Networking. The attractiveness of the institute is likewise judged to be excellent. Members of INM are actively engaged in numerous national and international scientific societies and collaborative networks, including the CosySpeech consortium (ERA-Net Neuron), the International Society of Developmental Neuroscience, the French Society for Neuroscience, the European Narcolepsy Network, the Société Française de Recherche et Médecine du Sommeil, and European initiatives such as COST Action Aniridia-Net. INM researchers also occupy leadership positions (president, vice-president, secretary-general) in several major associations and committees (e.g. ARSLA, AFM), contributing to the institute's scientific reputation and influence. The INM has recently established a Scientific Advisory Board (SAB) composed of distinguished international scientists. This board plays a key role in shaping the unit's scientific strategy and strengthening its international standing and visibility.

The institute also participates in European research consortia (H2020 EUROMET and ERA-NET Neuron) addressing important clinical and translational challenges, notably in the area of retinal and neurodevelopmental diseases. These collaborations, combined with extensive involvement in national networks, attest to INM's strong international profile and visibility.

Training capacity represents a further strength of the unit. Over the evaluation period, approximately 90 PhD students were enrolled across the institute's teams. About 50% of these students came from the University of Montpellier, 35% from other French universities, and 15% from foreign institutions, demonstrating INM's ability to attract a diverse and high-caliber cohort of doctoral candidates.

All research teams operate in full compliance with ethical regulations, particularly those governing studies involving animal models, human data, and biological samples. Researchers hold the required certifications for animal experimentation and adhere to established protocols concerning biosafety, GMO management, and the handling of biological materials and data. Montpellier University facilitates adherence to ethical standards through the provision of anti-plagiarism tools, while several researchers contribute to the institutional Ethics and Integrity Committee, actively participating in the formulation and oversight of ethical policies. In alignment with open science principles, research teams are encouraged to deposit their publications in the HAL repository, disseminate preprints to promote transparency and accessibility, and utilize electronic lab notebooks (CLE Inserm) alongside secure data storage systems to ensure research traceability and long-term data preservation.

Context-related weaknesses and risks for the four references above

While overall engagement in national and international networks is excellent, the participation of INM researchers in the organization of international scientific meetings remains relatively limited when compared to their contributions to national events. Increasing involvement in the hosting and chairing of international symposia would enhance the global visibility of the institute and further consolidate its leadership position in the field. In addition, the number of postdoctoral researchers (<15) remains comparatively low given the institute's scientific reputation and scale of activity. Recruitment of additional postdoctoral fellows would strengthen research continuity, foster innovation, and increase the international attractiveness of the unit as a destination for early-career scientists.

EVALUATION AREA 3: INCLUSION OF RESEARCH ACTIVITIES IN SOCIETY

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

The INM demonstrates strong clinical and socioeconomic integration through European networks, hospital collaborations and advisory board participation. Its innovation capacity is clearly evidenced by a structured patent portfolio start-up creation, gene therapy partnerships and translational platforms, reflecting effective knowledge transfer. Public engagement occurs through conferences, outreach activities and patient association partnerships addressing chronic pain and visual impairment. While media visibility and participation in broader societal debates could be further strengthened, the documented patent activity and its valorization through licensing and company creation significantly reinforce the unit's societal and economic impact. Overall, the inclusion of the unit's research activities in society is **excellent to outstanding**.

1/ The unit stands out for the quality of its interactions with the cultural, and socioeconomic world.

2/ The unit develops products and services for the cultural, socioeconomic world.

3/ The unit shares its knowledge with the general public and participates in social debates.

Context-related strengths and opportunities for the three references above

The unit stands out for its strong commitment to promoting and conducting clinical trials, backed by close collaborations with hospitals and national and European clinical networks. The INM demonstrates high-quality and well-structured interactions with the socioeconomic, clinical and institutional environments, supported by a solid level of scientific recognition. Team Sensation and Team Vision play a visible role through their involvement in advisory boards, expert panels and evaluation committees for major national and international funding agencies and European consortia. Team Vision is particularly engaged in European clinical and clinical-research networks in retinal diseases and maintains sustained collaborations with biotech partners such as Horama and Coave Therapeutics. More broadly, teams working on sensory systems, neurodegeneration and vision sciences maintain effective links with hospitals and industrial partners, positioning the unit as a reliable and well-identified actor at the interface between academic research, healthcare and the socioeconomic sector.

The INM has a proven track record of innovation reflected in a structured patent portfolio and in the effective valorization of its intellectual property through licensing agreements, industrial partnerships and company creation based on the development of diagnostic and therapeutic solutions. It shows a strong capacity to translate scientific results into products and services with tangible socioeconomic impact. Team Sensation has converted fundamental discoveries in sensory transduction and pain mechanisms into innovation outcomes, including patent filings and the creation of the start-up Dolinnov Biotech. Team Vision has developed gene therapy strategies and preclinical platforms for inherited retinal diseases in collaboration with industrial partners (Horama, Coave Therapeutics), supporting progression toward clinical application. Team Audition has protected innovative diagnostic methods for assessing auditory nerve responses and therapeutic approaches targeting inner ear fibrosis, strengthening its translational positioning in auditory disorders. Team Protéinopathies has secured patents on proteomic biomarkers in neurodegenerative diseases, with ongoing licensing activities and the creation of a spin-off, Spectrome, dedicated to biomarker valorization. Team Neuropeps has similarly filed a patent related to biomarkers in sleep and neurodegenerative disorders, currently under licensing negotiation. Altogether, these activities reflect a robust and effective knowledge transfer dynamic, fully aligned with the unit's scientific excellence and translational ambition.

Structured links with patient associations and long-term partnerships with industry, particularly in the fields of sensory neuroscience and vision, reinforce the societal and socio-economic impact of the unit's work. The unit contribute to knowledge dissemination and societal engagement. Team Sensation and Team Vision are active in organizing and contributing to national and international conferences, workshops and training events, which also serve as dissemination channels beyond the strictly academic community. Through outreach actions, public lectures and communication on major societal issues - such as chronic pain, sensory disorders and visual impairment - the unit contributes to public understanding and informed debate.

Context-related weaknesses and risks for the three references above

The successful development of diagnostic and therapeutic solutions, along with the creation of start-ups, indicates that there are no significant risks or weaknesses to report with regard to innovation. In terms of scientific outreach, the INM participates in a limited number of societal debates and has a modest presence in the media. The unit's production in terms of books for the general public is limited.

ANALYSIS OF THE UNIT'S TRAJECTORY

The INM is structuring its future around therapeutic innovation in sensory and motor functions, linking fundamental, translational, and clinical research within a unified strategic framework. Its scientific trajectory relies on transversal axes (exposomes, sleep, neurodegeneration, biomarkers) combined with deep analysis of central nervous system circuits, particularly sensory and spinal motor systems. Organizationally, the unit is reinforcing its position as a national and international reference center by coupling high-level basic research with clinically oriented programs in partnership with hospital structures. A major lever is proactive recruitment of junior team leaders, illustrated by the competitive international call that led to the selection of a young researcher, and a second mid-term call planned to consolidate strengths or open new lines of research within neurosensory and motor domains. This talent strategy, open to externally funded excellence profiles (e.g. ERC), ensures renewal of expertise and responsiveness to emerging scientific opportunities. In parallel, INM is reorganizing and expanding its technological platforms to create a more integrated, collaborative environment in which technical staff are fully embedded in scientific projects. Three flagship platforms structure the future organization. First, a Mouse Clinical Platform will standardize high-throughput behavioral phenotyping in neurosensory and motor domains, using automated, AI-based tools (e.g. DeepLabCut, SimBA) and led by a specialist in behavioral neuroscience and computational phenotyping. Second, the expansion of L2 facilities and the Sensory and Cerebral Organoids satellite platform anchors hiPSC and organoid approaches at the core of the unit, enabling patient-derived models, better alignment with 3R principles, and tighter integration with CHU Montpellier. Third, a high-density multi-electrode array (HD-MEA) electrophysiology platform, supported by dedicated engineering expertise, will provide high-resolution functional readouts of organoids, primary neurons, and CNS tissue, reinforcing INM's capacity to link cellular models to network-level physiology and pathology. Strengthening the INM's governance bodies and setting up weekly seminars and monthly meetings between young researchers will help to enhance laboratory life. Overall, the trajectory combines thematic focus (neurosensory and motor systems), technological upgrading, and strategic recruitment to build a coherent, vertically integrated research ecosystem from molecule to patient. This organization positions INM to increase its international visibility, attract competitive funding, and act as a hub for academic, clinical, and industrial partnerships in the rapidly evolving field of neurosensory and motor neuroscience.

RECOMMENDATIONS TO THE UNIT

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

The committee recommends formalising the organisation and functioning of the different committees and councils within the unit and to perform an update of the "reglement interieur". In terms of internal communication, organising the unit's activities and career support would be necessary. The appointment of one or two deputy directors responsible for these areas could be considered to assist the newly appointed director of the INM, which is located on several sites. Organising an annual day for doctoral and post-doctoral students could also serve as a tool for internal communication and for a contribution of the development of cross-disciplinary research projects. Despite a good gender ratio, the number of team leader positions held by women is low (two co-leaders among the 16 team co-leaders in the 2027–2032 project). Women should be encouraged to take on positions of responsibility.

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

The committee considers that the unit's scientific results, impact and attractiveness should be pursued along the current trajectory. The unit might consider to renew the call for new leaders, that was previously a success and design strategies to increase the number of international post-doc fellows or PhD students, as well as organisation and participation to international meetings.

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

The committee encourages the unit to continue with their excellent work on inclusion of research activities in society, in particular impact beyond researchers and interactions with patients and patient associations. Patent filing and the promotion of activities through the creation of start-ups could be better documented within the unit.

TEAM-BY-TEAM ANALYSIS

Team 1: Audition
Name of the supervisor: Mr Jean-Luc Puel

THEMES OF THE TEAM

The 'Deafness, Tinnitus and Therapies' team is working to unravel the mechanisms of auditory deficits in order to develop therapies. The team will be renamed the 'Hearing' team. The team comprises three groups that focus on the study of: 1) the molecular mechanisms of hair cell transmitter release and sound encoding logic; 2) the molecular mechanisms of hearing impairment and hair cell regeneration; 3) the transfer of innovative diagnostic tools and clinical trials to the clinic.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The previous report highlighted the need to attend more international meetings, participate in national scientific events, organise teaching courses and invest in social networking. This recommendation was considered given that lab members attend international conferences (see the Association for Research in Otolaryngology) and teach at international summer schools (see the Gordon Research Conferences). In line with the recommendation to improve communication with students and foreign postdoctoral researchers, the team pointed out the numerous laboratory meetings conducted in English and attended by trainees and mentors. Finally, a word of caution was issued regarding the implementation of the Clinical Research Centre at AudioCampus, as well as the retirement of the team leader. AudioCampus was successfully launched at the end of 2024 with the aim of conducting research involving patients, audiologists, industry, charities, public authorities and academia. Three team members teach/train at AudioCampus. Regarding the hiring strategy, two Inserm CRCN were recruited as a new focus on the ascending auditory pathway was introduced.

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

Catégories de personnel	Effectif
Professeurs et assimilés	4
Maitres de conférences et assimilés	2
Directeurs de recherche et assimilés	2
Chargés de recherche et assimilés	3
Personnels d'appui à la recherche	1
Praticien hospitalier	1
Sous-total personnels permanents en activité	13
Enseignants-chercheurs et chercheurs non permanents et assimilés	1
Personnels non permanents d'appui à la recherche	0
Post-doctorants	2
Doctorants	19
Sous-total personnels non permanents en activité	22
Total général	35

EVALUATION OF THE TEAM

Overall assessment of the team

The team considered as **excellent to outstanding** in light of its remarkable attractiveness (two researchers have been hired and a third is joining the team), its excellent publication track record in both fundamental and clinical areas, and its numerous conference presentations, posters and communications. The team has also received an impressive amount of competitive funding from national and international sources (€5.3 M). The team has several projects in national, European and American programs, and its two team leaders have high international recognition. Its outstanding contributions to society include consultancy work, partnerships with industrial companies, developing start-ups, obtaining patents, disseminating information via a website, and establishing the Audiocampus.

Context-related strengths and opportunities

During the evaluation period (2019-2024), the team investigated how auditory nerve fibers function, including NMDA receptor activation in the cochlea and noise-induced synaptic loss using the PSTR method, and identified a new class of fibers emerging after excitotoxic injury. They also studied molecular mechanisms behind hereditary and age-related hearing loss, including DFNA25, dominant optic atrophy, oxidative DNA damage, and thyroid-hormone-related pathways. In addition, they advanced translational research by exploring links between hearing and balance disorders, adapting the PSTR method for human auditory assessment, and developing self-screening tools and a tele-audiology platform. The team has published 29 original articles as major authors in high-ranked journals (e.g. Advanced Science, Journal of Neuroscience, Proc. Natl. Acad. Sci., eLife, Annu. Rev., EMBO J. and Cell Rep.). Eighteen articles were also published as clinical articles in parallel. Twenty publications were based on national or international collaborations. Twenty-seven of the articles included PhD students, 13 of which were first (or co-first) authors. The team patented two novel technologies: a tool for measuring temporal properties of the human auditory nerve and a strategy for preventing inner ear fibrosis. The team is well equipped (5 in vivo setups and 3 patch-clamp setups). The team has been part of the CosySpeech consortium funded by the European ERA-NET neuron network. A strong partnership was developed with industry or start-up (Amplifon - analyse of audiograms from 1.3 million patients, Cilcare, Cochlear, Sonup). Some team members are involved in consultancy work, and patented a novel technological tool for measuring the temporal properties of the auditory nerve in humans, as well as a new strategy for preventing fibrosis of the inner ear. The team disseminates information via the 'Voyage au Centre de l'Audition' website, and via publications in Scientific and General Audience journals, Interviews on several media platforms. The team was able to raise €5.3 M through multiple funding opportunities, including international sources such as the US Department of Defense and European funding from sources including the ERA-NET Neuron and ANR-PRCI, as well as national grants from the ANR PRC, Operation Campus and charity funding. ERA-NET Neuron, ANR-PRCI), national grants (ANR-PRC, Operation Campus) and charity funding (Fondation de l'Avenir, Fondation pour l'Audition, FRC, Gueules Cassées). Fondation de l'Avenir, Fondation pour l'Audition, FRC and Gueules Cassées), as well as industry partners (Amplifon, Cochlear and Cilcare). Remarkably, the team launched the Audiocampus in 2024. This unique centre of excellence is located on the university campus and is dedicated to education and research. In terms of recruitment, the team performed well, hiring two Inserm researchers and attracting one CNRS CRCN researcher. The team's attractiveness was also evidenced by the hosting of five postdoctoral researchers, eighteen PhD students, one engineer and more than fifty-one master's students.

Context-related weaknesses and risks

The team will be restructured with two team leaders and a new research focus on the inferior colliculus-thalamus-striatum network, coinciding with the arrival of a new permanent Inserm researcher. The committee therefore advises the team to be vigilant during the integration of the new scientific project. Additionally, the auditory nerve sub-team, comprising a lecturer and a postdoc, should seek support from other team members due to the lecturer's teaching responsibilities.

ANALYSIS OF THE TEAM'S TRAJECTORY

The three research areas — sound coding, hearing impairments and the translational aspect — remain in the Hearing team, even though one project leader has joined the Biotherapy team and the other is no longer on the organisational chart. Another subproject focusing on the colliculo-thalamo-striatal circuit has been proposed thanks to the arrival of a new Inserm researcher. The team benefits from the arrival of two Inserm CRCNs. One will lead the Cochlear Nucleus group, but the other choose to join another team for the next period.

Overall, the team's structure is solid and benefits from the development of AudioCampus, but attention must be given to consider the recent reorganisation.

RECOMMENDATIONS TO THE TEAM

As the team's research interests are closely linked to human pathologies, its members could consider strengthening interactions between the three research areas. The molecular aspects addressed by the team, such as the function of TMIE, could be explored using hiPSCs, which could be developed at the organoid iPSC platform. The team should make a constant effort to publish high-quality work in order to reach a wider audience, especially in the context of AudioCampus.

Team 2: Corticogenesis
 Name of the supervisor: Mme Karine Loulier

THEMES OF THE TEAM

The aim of the "Corticogenesis" team is to elucidate the cellular and molecular mechanisms governing the generation and maintenance of neural cell diversity in the mammalian neocortex, under both physiological and pathological conditions, through the application of newly developed multicolor fate-mapping approaches.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The team was created at INM within the framework of the ATIP-Avenir program at the beginning of the previous evaluation period and was consequently not reviewed by the preceding Hcéres committee.

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

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

EVALUATION OF THE TEAM

Overall assessment of the team

Team "cortocogenesis" is a small team that was initiated at the beginning of the previous period. Despite initial difficulties associated with covid period and building renovations the team scientific output is excellent, featuring several publications (10) in top specialized and generalist journals (2 publications in Nature Communication). The team leader also demonstrated fundraising ability (€1.3 M) during this period (2 ANR grants, FRM and regional academic grants), developed a collaboration with the other young ATIP-Avenir team (team "Oeil") at INM (2 joint publications) and actively contributed to the animation and management of developmental neuroscience community. Given the challenges faced by the team in recruiting new permanent researchers in light of Inserm's stringent selection criteria in this field, the team has decided to merge its efforts with the "Eye" team for the forthcoming period. Overall the team is evaluated as **excellent**.

Context-related strengths and opportunities

The research team was established between late 2018 and early 2019 with the support of ATIP-AVENIR funding, building upon a solid scientific foundation. The team leader demonstrated strong research leadership, notably through the publication in 2019 of two significant articles in *Nature Communications*, including one as the senior author. Despite the initial constraints imposed by the COVID-19 pandemic and ongoing building renovations, the team successfully secured additional competitive funding amounting to €1.3 million. Over this period, it also attracted several early-career researchers, including three doctoral candidates (One co-supervised with the "Oeil" team) two postdoctoral fellows and 23 Masters, licence and BTS students. The team leader has been extensively engaged in the national and international developmental neuroscience community. She served as Secretary of the Neural Network Development Club from 2018 to 2024, was appointed Secretary-General of the International Society for Developmental Neuroscience in January 2025, and, since April 2025, has held the position of elected representative of the "Neurodevelopment" section within the Société des Neurosciences. Furthermore, the team leader has played a major role in the organization of scientific events, contributing to two local, one national, and two international meetings, and has been actively involved in various institutional committees and selection juries at the local level.

Context-related weaknesses and risks

The principal weakness of the team resides in the absence of permanent researchers apart from the team leader, a limitation that was also emphasized by the INM Science Advisory Board at the beginning of 2025. This situation is particularly significant given the team leader's substantial involvement in the coordination and management of the associated scientific community, an engagement that constitutes both an opportunity and a potential vulnerability. Furthermore, the team has not succeeded in attracting clinicians, nor has it established meaningful collaborations with industrial partners. Considering these factors, the team has elected to follow the recommendation of the Science Advisory Board to merge with the "Oeil" team in the forthcoming period. This strategic integration aims to consolidate expertise, resources, and infrastructure, thereby enabling both groups to achieve greater research impact, synergy, and operational efficiency.

ANALYSIS OF THE TEAM'S TRAJECTORY

The Corticogenesis team will be integrated into the EYE team for the forthcoming period. The former team leader, will assume responsibility for one of the three scientific themes within the newly structured team, dedicated to the study of brain plasticity and visual integration. This reorganization is driven by the challenges faced in recruiting permanent researchers and establishing clinical collaborations, which have resulted in a limited critical mass—an essential criterion for Inserm accreditation. From a scientific standpoint, the proposed integration is coherent and strategically sound, as the two teams already share strong research synergies evidenced by a joint ANR grant, two co-authored publications, and the joint supervision of a PhD student and an UM technician. Furthermore, a recently appointed MCU will reinforce the subgroup. This restructuring fully aligns with the recent recommendations of the Scientific Advisory Board and aims to enhance the team's scientific coherence, visibility, and sustainability.

RECOMMENDATIONS TO THE TEAM

As noted in the 2025 SAB report, the team has developed a well-designed project, supported by sufficient funding, and has demonstrated impressive productivity despite its relatively small size. With the novel organizational structure proposed for the next period, the team should ensure that it prioritizes the dissemination of findings from the two PhD theses completed in recent years. Such publications would not only highlight the quality and continuity of the team's research but also strengthen its academic visibility and overall contribution to the field. In addition, building strong collaborations with clinicians and attracting industrial partners will be vital aspects of the project.

Team 3: Motoneuron
 Name of the supervisor: Mr Cédric Raoul

THEMES OF THE TEAM

The research focuses of the team "motoneuron" is to understand the cell-autonomous and non-cell-autonomous mechanisms of motoneuron vulnerability in Amyotrophic Lateral Sclerosis (ALS), the most common motor neuron disease of the adult. The ultimate goal of the team is to develop effective therapies for ALS.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

Previous recommendations have been answered the following way. For criterion 1 it concerned enhancing the pace and regularity of publication of all members. The team has been able to maintain this publication rate and even increase its output beside several members leaving the lab (mainly due to retirement) and new members coming. Criteria 2 recommendations were to avoid dispersion, to increase regular meetings and integrate gender parity. Since the team leader had spent time abroad, the Hcéres members wonder if this point was raised related to the team leader not being physically on site. This has been answered by refocusing the thematics and improving interactions including by enhancing efficacy of weekly team meetings. Gender balance has also been considered. In criteria 3, the previous committee recommended that the team members prioritize their sub-aims to efficiently work together and bring their various expertise and experience towards a common goal. The team has answered by refocusing their scientific projects around neuroinflammatory environment related to immunity and astrocytes avoiding thematic dispersion.

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

Catégories de personnel	Effectif
Professeurs et assimilés	3
Maitres de conférences et assimilés	2
Directeurs de recherche et assimilés	1
Chargés de recherche et assimilés	5
Personnels d'appui à la recherche	5
Praticien hospitalier	5
Sous-total personnels permanents en activité	21
Enseignants-chercheurs et chercheurs non permanents et assimilés	1
Personnels non permanents d'appui à la recherche	2
Post-doctorants	4
Doctorants	9
Sous-total personnels non permanents en activité	16
Total général	37

EVALUATION OF THE TEAM

Overall assessment of the team

The team's overall **excellent** evaluation is building on a multidisciplinary expertise with a strong link to the clinics and a clear commitment to translational research. During the evaluated period, they got a very good publication record and important amount of competitive funding mainly from national but also international funding sources with established collaborations. The contributions to society are excellent.

Context-related strengths and opportunities

During the evaluation period, the team's main achievement focused on intrinsic and extrinsic determinants of ALS pathology. Concerning the intrinsic determinants: (i) they identified TMEM16F channel as a component of cholinergic C-boutons on alpha motor neurons and showed its implication in ALS mice published in Soulard et al., Cell rep, 2020. (ii) They studied axonal transport mechanism using a $\Delta 27$ -KIF5A knock-in drosophila model, supporting a toxic-gain-of-function mechanism of the ALS-linked KIF5A mutation, published in Neuroscience in 2023 and in Sci Rep 2024. The team also benefits from the Nime molecular diagnosis effort that implemented a zebrafish platform to reveal pathogenicity of variants identified in ALS patients' genome, important for genetic counselling. Concerning extrinsic factors, (i) the team showed the toxicity of CD8+ T cells towards motor neurons, published in PNAS in 2019. (ii) the second focus was on glial cells through collaborative efforts of a European consortium, published in Glia in 2021 and Neuobiology Dis in 2024. Through a collaborative effort supported by the ANR and led by the Team leader they studied the oligodendrocyte-enriched ubiquitin protease USP19, project that the team is currently finalising. Altogether, this shows the important contribution of the team that published 19 original papers with 9 as first, last, corresponding, 6 reviews and 46 clinical papers (14 as lead). The PhD students graduated with an average of 3 publications. The young scientists have regularly presented and received prizes for their presentations at a national meeting. The team has strong national and international collaborations and was successful in raising competitive funding including two ANRs led by the team leader, one international funding and yearly funding from French associations. The team has 5 permanent technical staff which represents a real asset to help move project forward.

The team is multidisciplinary including neurobiologists, electrophysiologists, immunologists, drosophilists, neurologists and ALS geneticists with a commitment to develop a strong basic research and to translate it to the clinics.

Concerning their engagement to animation and management of its community, they have regularly organized a conference related to electrophysiology. The team leader serves as president of the scientific advisory board of the French ALS association, the French national ALS cohort PULSE, president and vice president of AFM evaluation committees and member of editorial boards of peer reviewed journals. One team member, on a university position (MCU), is elected member on several university committees (CNU). The team also regularly interacts with the society through the patient association and to broader community for webinar and video to rise awareness for ALS. The team has also links with economic world with two patents in progress.

Context-related weaknesses and risks

Risks for the team concern an important turnover since two scientists left either due to retirement or transition of career as well as two MDs i.e., the head of the ALS clinics of Montpellier and the head of the molecular biology department due to retirement. The team has still a strong connection with the clinicians including MDs already present in the team and integration of five new clinicians including the new head of the ALS clinics. No new scientists joined the team but, five permanent researchers are part of the team and cover the different multidisciplinary area. The team has an important number of permanent scientists and MDs, however, it is not clear if they all lead projects and what is the weight of these members in the acquired funding and supervision of young scientists. It is however clearly mentioned that the team's policy is to promote research staff to publish as first, last or corresponding author to legitimize their involvement in project management and fund-raising which led to 4 out of the 9 publications as lead authors being from the permanent researchers. The distinction between the added value of the clinical staff for the scientific projects of the team and the projects that run in clinical practice is not well described.

ANALYSIS OF THE TEAM'S TRAJECTORY

The team has been implanted at the INM since 2012 and continues its line of research, since then. The team that has grown with several permanent researchers and clinicians joining the team has encountered several leaves during the evaluation period. However, it kept its multidisciplinary aspect and its strong link to the clinics. Its research projects have been refocused to answer to previous recommendations and the team will continue to follow this line that has been successful to publish a good number of articles, with different permanent members as lead author.

RECOMMENDATIONS TO THE TEAM

For the future projects, it would be important to define the lead PI for each line of research and to clarify the projects that are developed in the research team with the collaboration of the clinicians compared to the ones that are developed for clinical practice. With the multidisciplinary approach of the team, it could be of added value to have projects better embedding the different technical skills in a collaborative effort. The team wants to develop iPSC technology within the team but, since, this technology is already available at the INM, doing it in collaboration could be an advantage to rationalise the effort.

Team 4: Neuropeps
 Name of the supervisor: Mr Yves Dauvilliers

THEMES OF THE TEAM

The team's themes were organised under three different topics (i) improving our understanding of the mechanisms regulating sleep and the biological processes involved in sleep disorders; (ii) characterising the link between long-term environmental exposure to factors such as air pollutants and the risk of cognitive decline and neurodegenerative diseases; (iii) the characterisation of the interaction of biological, behavioural and environmental factors with neuropsychiatric and neurodegenerative pathologies, to determine how susceptibility to these diseases can consequently increase.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The Neuropeps team does not seem to have well handled the recommendations of the previous Hcéres evaluation: (i) a low number of postdoctoral fellowships recruited, (ii) poor collaborations between the three groups, and (iii) consequently, a poor broader concept allowing synergies between the three groups.

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

Catégories de personnel	Effectif
Professeurs et assimilés	2
Maitres de conférences et assimilés	2
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	1
Personnels d'appui à la recherche	5
Praticien hospitalier	4
Sous-total personnels permanents en activité	14
Enseignants-chercheurs et chercheurs non permanents et assimilés	3
Personnels non permanents d'appui à la recherche	2
Post-doctorants	0
Doctorants	10
Sous-total personnels non permanents en activité	15
Total général	29

EVALUATION OF THE TEAM

Overall assessment of the team

Overall, this is an **excellent team** with heterogeneous topics. This is a team with strong clinical and translational relevance, as demonstrated by their excellent links to the hospital and university and their strong implications in clinical trials. This team also has an excellent capacity to secure funding. Its excellent contributions to society include partnerships with industrial companies, obtaining patents, disseminating information and interacting with patient associations.

Context-related strengths and opportunities

This team groups together three groups. Although quite heterogeneous between the three groups, the team published a significant number of papers, some of which were in major medical journals (including NEJM, the Lancet and the Lancet Neurology). However, these major papers were mostly related to the clinical activity of the team leader. Similarly, the team was successful in obtaining regional, national and international funding. The project also relies on well-characterised cohorts. The head of the team is highly visible at national and international levels in the field of sleep research. The team recruited one engineer who did her thesis in the team as well as two hospital staff (who were both trained in the team). The latter recruitment strengthened the strong connection with the Montpellier University hospital. The team is actively involved in communicating with the public and regularly participates in the consultation of research strategies with patient associations, industry and start-ups. The team has thus developed strong interactions with economic actors through translational research.

Context-related weaknesses and risks

The Neuropeps team seems to have the same weaknesses as those mentioned in the previous Hcéres evaluation: (i) a low number of postdoctoral fellowships recruited, (ii) poor collaborations between the three groups, and (iii) consequently, a poor broader concept allowing synergies between the three groups. Despite the fact the team benefits from six permanent technicians (for 6 permanent researchers), four of them dedicated 50% time for the epidemiology in neuroscience statistical platform and it is not clear how this technician time was distributed between groups which is concerning as the groups do not strongly interact.

ANALYSIS OF THE TEAM'S TRAJECTORY

The team will undergo a major reorganisation, with the sleep group merging with the biomarker group of the Proteinopathies team. Both teams have specific areas of expertise and are well recognised in their respective fields. Both teams will continue to explore their respective themes in an adapted way. This choice also seems appropriate given the possibility of creating synergies between the two groups, as sleep disturbances are increasingly recognised as risk factors for dementia.

RECOMMENDATIONS TO THE TEAM

This team will undergo a major reorganisation with the merger of the sleep group and the biomarkers group from the 'proteinopathy' team. As a result, it is difficult to make recommendations. However, it is important that these two teams create real research synergies and are not simply two groups brought together for convenience. It is also important that this new team improves its ability to recruit postdoctoral researchers, who are a marker of the international visibility of research. Similarly, this team could improve its level of publications (without relying primarily on a single clinical activity, which is obviously necessary).

Team 5: Eye
 Name of the supervisor: Mr Frédéric Michon

THEMES OF THE TEAM

The Eye team is working on primarily ocular disorders, with two research axes led by two researchers (DR2 Inserm). One group is focused on the cornea and the anterior segment, using various models (genetic, induced) while the other group focuses on inherited optic neuropathies.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

There were no previous recommendations as the Team was an ATIP Avenir team, not evaluated by the Hcéres.

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

Catégories de personnel	Effectif
Professeurs et assimilés	3
Maitres de conférences et assimilés	2
Directeurs de recherche et assimilés	4
Chargés de recherche et assimilés	2
Personnels d'appui à la recherche	6
Praticien hospitalier	6
Sous-total personnels permanents en activité	23
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels non permanents d'appui à la recherche	3
Post-doctorants	2
Doctorants	7
Sous-total personnels non permanents en activité	12
Total général	35

EVALUATION OF THE TEAM

Overall assessment of the team

This is a group with strong clinical and translational relevance, as demonstrated by their strong links to the hospital and university and their strong embedment in their respective reference/competence centers for their disease of interest. Overall, this is an **excellent team** with two research axes that are balanced in HR, scientific production and strong ties with clinical services and high translational relevance.

Context-related strengths and opportunities

A major strength of this team is that the two research axes are led by two complementary PIs, that have each their individual strong visibility and independence. The complementarity between the two groups is already visible with several common publications.

A strength of the team is also an excellent balance between permanent researchers and hospital practitioners allowing to maintain excellence in both research axes. Workforce is sufficient for both of them and there is a good balance in HR between the two groups. Research funding is appropriate and competitive with 3.9M€, split between ANR (1.4M€), Idex (0.6M€) and charities (1.8M€). This is excellent for a team of this size. Publication output is very important quantitatively (>100 research articles with senior authors from the team, with about half of them in A/B journals). In their portfolio, the publications highlighted are in good journals (sci report, mol ther) and one highly prestigious journal (J Clin Invest). The team also produced last authors publications as senior author in reference journals including IOVS, CMLS etc. The collaborative output is excellent with co-authorships of several PIs of the team in large consortia papers. On top of this publication record, the team has produced several patents and clinical trials with possible important impact for their diseases of interest. Animation and community involvement is excellent with strong ties to patient's associations and academic reviewing internationally.

Context-related weaknesses and risks

The existing synergy between both PIs should be reinforced by common grants and students, and it is not entirely clear whether there is a plan to improve the synergy between both research groups. The visibility and impact of publications is very good but could be improved.

ANALYSIS OF THE TEAM'S TRAJECTORY

The two groups of the Eye team will continue their current research program without major restructuring. However, a third group (i.e., former leader of the corticogenesis team), will lead a third research axis on brain plasticity. This is a major addition, with an excellent research group. It should be noted that this third group expands the number of structures and diseases (up to ASD) studied in the Team. The team leader is aware that there is a risk of dispersion, and has already identified a number of diseases (e.g. aniridia, glaucoma), that will be studied in all three groups of the team to ensure consistency and team cohesion. There are already several common projects between the three PIs which is very reassuring for the next mandate.

In all, the trajectory of the team is excellent and the risk of dispersion identified and appears already largely mitigated.

RECOMMENDATIONS TO THE TEAM

Develop structuring projects across all three research axes to avoid dispersion and maintain team cohesion.

Team 6: Proteinopathies
 Name of the supervisor: Mr Sylvain Lehmann

THEMES OF THE TEAM

The themes of the Proteinopathy team deal with the molecular mechanisms involved in the pathophysiology of Alzheimer's disease, with a particular focus on the role of endogenous factors such as genetic mutations, and exogenous factors, such as environmental pollutants leading to the neurodegenerative process.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

Previous recommendations relied first on increasing the quality (over the quantity) of the publications in higher impact journal. The team has answered by mentioning that they have, in this period, published 22 articles in journals with IF>10. They also mentioned that, due to the involvement with their proteomic activity, they have a high number of publications, necessary to justify their platform activity that can dilute their ratio of high-quality publications. The team was also asked to focus on their thematics and to select specific niches. The team answered that they took these recommendations into account by focusing on (i) environmental factors and (ii) biomarkers.

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

Catégories de personnel	Effectif
Professeurs et assimilés	3
Maitres de conférences et assimilés	3
Directeurs de recherche et assimilés	2
Chargés de recherche et assimilés	1
Personnels d'appui à la recherche	4
Praticien hospitalier	2
Sous-total personnels permanents en activité	15
Enseignants-chercheurs et chercheurs non permanents et assimilés	1
Personnels non permanents d'appui à la recherche	1
Post-doctorants	0
Doctorants	14
Sous-total personnels non permanents en activité	16
Total général	31

EVALUATION OF THE TEAM

Overall assessment of the team

The team is **excellent to outstanding** overall, with an excellent publication track record and a remarkable capacity to secure funding (more than 12 million euros). Its excellent contributions to society include partnerships with industrial companies, developing start-ups, obtaining patents, disseminating information, coordinating CoEN and organising national congresses.

Context-related strengths and opportunities

The proteinopathies team comprises three groups that work on the following, respectively: (i) iPSC models; (ii) the impact of pollutants on neurodegenerative diseases; and (iii) the development and assessment of biomarkers for neurodegenerative diseases. Overall, the team has published a significant number of papers. The team published 144 articles. Among these articles, 64 were signed as first, last or corresponding author. The team also established numerous international collaborations, as evidenced by consortium articles and the coordination of a Horizon Europe project. The latter also highlights the team's remarkable funding levels (€12,8 M), ranging from charity grants to national and international ones. The team has also developed a robust transnational strategy in collaboration with the Montpellier hospital, as demonstrated by the launch of two start-ups. The team is developing an important strategy to acquire technologies, some of which are shared with platforms. The team plays an active role in the management and development of its scientific community. A notable example is the "Montpellier Alzheimer's Day", which has become a well-recognised event in the national conference landscape of this field. Finally, the team is involved in communicating research to society, particularly through patient associations.

Context-related weaknesses and risks

There are several areas that could be identified as weaknesses. Despite a high level of funding, the number of publications in highly visible journals is low. The small number of postdocs recruited calls into question the attractiveness of the team. The iPSC group developed several cell lines of interest, but did not progress beyond the technical development stage, resulting in a low volume/level of publications. The team did not recruit for permanent positions.

ANALYSIS OF THE TEAM'S TRAJECTORY

The proteinopathies team resulted from the fusion of two research units (U1198 and U1040). This fusion seemed logical according to the thematics described but it appears that not so many synergies were developed between the three groups. As a consequence, the trajectory proposed seems to be adapted by focusing on the impact of pollutants on neurodevelopment and neurodegenerative diseases using 2D/3D human cultures and animal models. The strategy appears complementary and original. Moreover, the team will soon resume prion-related work following a temporary moratorium on this activity.

RECOMMENDATIONS TO THE TEAM

This team will also undergo a major reorganisation with the merger of groups originated from the Neuropeps team and from this team. As a result, it is difficult to make recommendations. However, as for the new team "biomarkers" it is important that this new "proteinopathies" team creates real research synergies. It is also important that this team improves its ability to recruit postdoctoral researchers, who are a marker of the international visibility of research. Similarly, this team could improve its level of publications.

Team 7: Sensation
 Name of the supervisor: Mr Fabrice Ango

THEMES OF THE TEAM

The goal of the team that was created in 2021 is to understand how sensory circuits are established and functionally integrated with a particular focus on the cerebellum, with the aim to uncover how the cerebellum contributes to sensory perception and modulation, especially in chronic pain conditions.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The recommendations concerning the scientific production and activities of the team primarily emphasized the importance of maintaining its already excellent research output while further enhancing its engagement in the organization of national round tables as well as national and international congresses in Montpellier, with the objective of increasing the team's visibility. The team has successfully maintained its high level of scientific excellence, as demonstrated by several publications in prestigious generalist journals, including *Nature Communications*, *JCI Insight*, and *Cell Reports*, where team members appear as both first and last authors. Several members of the team were involved in the organisation of national symposia/congress in Montpellier but not international events. The second recommendation specifically pertained to the fact that the current team resulted from the merger of two distinct research groups in 2021 and, consequently, needed to develop new conceptual frameworks that effectively integrate the expertise of both subgroups. Progress in relation to this recommendation remains uncertain, as no joint publications combining research on the cerebellum and pain have been reported to date, and only the submission of a single collaborative project has been documented. The third recommendation, which underscored the importance of recruiting additional postdoctoral researchers to consolidate the various research axes, has recently been addressed by the recruitment of two postdocs that will reinforce the research capacity of the team.

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

Catégories de personnel	Effectif
Professeurs et assimilés	3
Maitres de conférences et assimilés	3
Directeurs de recherche et assimilés	2
Chargés de recherche et assimilés	1
Personnels d'appui à la recherche	4
Praticien hospitalier	2
Sous-total personnels permanents en activité	15
Enseignants-chercheurs et chercheurs non permanents et assimilés	1
Personnels non permanents d'appui à la recherche	1
Post-doctorants	0
Doctorants	14
Sous-total personnels non permanents en activité	16
Total général	31

EVALUATION OF THE TEAM

Overall assessment of the team

The team has complementary expertise ranging from molecular to clinical research with a strong potential for real translational research. The scientific output and patenting in the field of pain are excellent to outstanding and the creation of a start-up company with a team member as co-founder is an added value. The team was successful on obtaining National funding from different sources (academic, charity, valorization...) but international funding and specially EU funding is still limited. Several clinicians are affiliated with the team; however, their actual involvement in the team's activities is difficult to quantify, as more than 100 of their publications are "not directly related to the team's research activities", and only one clinician of the team appears to publish on the projects conducted in the team. Overall and in light of the above-mentioned element, the team is considered **as excellent to outstanding**.

Context-related strengths and opportunities

The team demonstrates strong scientific production, high attractiveness for young researchers, and a clear commitment to leadership, patient engagement, and public science communication. During the last evaluation period, the team published several articles in high-impact generalist journals, including Nature Communications, eLife, Cell Reports and JCI Insight, underscoring both the quality and international visibility of their work. The team's innovation capacity is further evidenced by an excellent patenting activity in the field of pain, with 5 patents filed over the period and the involvement of one team member in the creation of a start-up company dedicated to valorizing the team's discoveries. Regarding attractiveness and training, the team is highly attractive for young scientists, currently hosting 14 PhD students, mainly from the University of Montpellier, with 6 of them still in the process of completing their thesis. This dynamic environment is complemented by a strong involvement in the teaching and institutional life of the University of Montpellier, as well as the recent recruitment of two postdoctoral researchers, which strengthens both mentoring capacity and scientific expertise.

It is also important to emphasize that the group plays a clear leading role at the national level through its participation and leadership in national scientific organizations (One team member is playing a leadership role in the French Neuroscience Society and is of the CSS4 of Inserm and another one is Vice President of the French Cerebellum Club) and networks (several teams members chaired sessions in national and international meetings). This leadership consolidates the team's position as a reference in its field and enhances its capacity to attract collaborations and resources.

The team is actively engaged in inclusion and in building bridges with civil society, notably via a long-term collaboration with the patient association "Les enfants du feu," which supports families affected by primary erythromelalgia and promotes research on this rare, very painful neurovascular disease. This partnership illustrates the team's commitment to integrating patient perspectives into research priorities and to contributing concretely to improving patient care and quality of life.

Finally, the team is very active in science communication and public dissemination of research, regularly participating in events such as the "Fête de la Science" and other local and national conferences aimed at the general public. In collaboration with the Kimiyo association, which specializes in organizing science-society encounters, team members contribute to vulgarization events, public debates (Tchatche 2.0, Tchatches & Sciences, InScience – La science avec et pour la société) and several radio podcasts, thereby strengthening dialogue between research, patients and citizens.

Context-related weaknesses and risks

The team brings together both academic researchers and clinicians, reflecting a multidisciplinary approach that is essential for translational research. However, the effective engagement of clinicians in the research activities of the team remains limited. Although clinicians contribute a considerable number of publications, these outputs are largely unrelated to the main scientific directions of the team. With the exception of one PU-PH, clinicians are not directly involved in ongoing research projects, which limits the integration between clinical practice and experimental research.

The team includes a small number of full-time researchers: one CNRS Directeur de Recherche, who will assume the direction of both the Unit and the team, and one Inserm Chargé de Recherche. Two postdoctoral researchers were recently recruited, contributing to a modest reinforcement of the team's research potential.

The Professor and Maîtres de Conférences Universitaires are highly engaged in teaching duties at the University of Montpellier, which significantly enhances the team's attractiveness to Master's and doctoral students. Nevertheless, these pedagogical commitments reduce the time that can be devoted to research supervision and project development.

At the financial level, the team currently benefits from a low level of European Union funding. This limited access to external competitive funding may restrict the scope of the team's future research initiatives and its capacity to strengthen international collaborations.

ANALYSIS OF THE TEAM'S TRAJECTORY

The team "Sensation" will be renewed for the forthcoming period in a configuration that ensures continuity with the work undertaken during the previous cycle. Three principal research themes will be pursued by (i) Investigating the development and diversification of inhibitory synapses within sensory circuits, (ii) characterizing FLT3- and opioid receptor-associated signaling pathways in the regulation of chronic pain and (iii) studying of the roles of Fxyd2 and Fxyd7 within sensory circuits and the cerebellum.

Although the team has expressed a clear commitment to orient its research activities toward the study of chronic pain, the various scientific axes appear to remain insufficiently integrated—particularly the first theme, in comparison with the second and third. This limited coherence is reflected both in the distribution of funding already secured for the upcoming period across the three axes and in the team's name, which does not explicitly incorporate the chronic pain dimension of its research orientation.

The team leader will also assume leadership of the INM for the upcoming period. He will be supported by an Inserm CR, who will assist in leading the team and research axes 1. Axes 2 and 3 will continue to be coordinated by the scientists who were responsible for their leadership in the previous period.

RECOMMENDATIONS TO THE TEAM

The team should continue to demonstrate a high level of scientific productivity and visibility. Maintaining the quality and impact of this research output remains a top priority. Efforts will focus on reinforcing methodological rigor, promoting collaborative projects, and ensuring that results are disseminated in leading international journals. To further enhance the scientific coherence of the group, particular attention should be given to strengthening the synergy between the three subgroups. The combination of their complementary expertise is essential to address interdisciplinary research questions more effectively. Regular joint meetings, shared research platforms, and cross-subgroup initiatives will support this integrative approach. Considering the team's strong involvement in translational research, it will be important to reinforce the participation of clinicians in ongoing and future projects. Greater integration with clinical departments will ensure a continuous dialogue between basic and applied research, fostering translational outcomes and facilitating the transfer of discoveries into clinical practice.

With respect to the human resources and recruitment, the consolidation of the team's long-term scientific strategy requires an increase in the number of full-time researchers. Dedicated efforts will be made to secure the necessary funding to recruit highly skilled postdoctoral researchers, thereby promoting innovation, mentoring, and the development of new technical expertise within the team.

In terms of visibility and attractiveness, it is recommended to enhance the national and international visibility of the unit, members will be encouraged to participate actively in major international conferences (e.g. SfN, IASP) and to take leadership roles in the organization of scientific events and workshops in Montpellier. These initiatives will contribute to positioning Montpellier as a hub of excellence in pain research and will attract collaborations and new talents.

Finally, regarding funding and international partnerships, a final priority is to increase the level of international and, in particular, European funding. The team will strengthen its participation in EU-funded programs (such as Horizon Europe) and other international consortia. Building such partnerships will not only enhance financial sustainability but also promote a dynamic, globally connected research environment.

Team 8: Vision
 Name of the supervisor: Ms Vasiliki Kalatzis

THEMES OF THE TEAM

The Vision team is focusing on genetic diseases of vision and audition. It team is composed of three groups: (i) a hospital group (reference center for rare diseases) focusing on rare eye diseases and in charge of a reference center, (ii) a second hospital group on neurosensory pathologies affecting vision and hearing, and in charge of a second reference center and (iii) a group led by an Inserm DR, and with another tenured researcher, focusing on functional studies of identified variants, with a focus on iPSC and gene therapy.

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The recommendations of the previous Hcéres committee were first to secure more long-term funding: this has been partially achieved with two ANR and two other competitive programs. They were also asked to publish in higher profile journals: this is only partially obtained, as the team published in very good speciality journals but not in more generalist journals. Finally, the number of PhD students had to be increased as argued by the team, the number of HDR limits the team in terms of simultaneous PhD students. This could be solved in the next term with the arrival of Dr Wang.

Of note, the major comment on the lack of collaboration between the two groups is no more valid as two groups have joined forces.

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

Catégories de personnel	Effectif
Professeurs et assimilés	0
Maitres de conférences et assimilés	0
Directeurs de recherche et assimilés	1
Chargés de recherche et assimilés	3
Personnels d'appui à la recherche	9
Praticien hospitalier	2
Sous-total personnels permanents en activité	15
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels non permanents d'appui à la recherche	2
Post-doctorants	3
Doctorants	6
Sous-total personnels non permanents en activité	11
Total général	26

EVALUATION OF THE TEAM

Overall assessment of the team

This is overall an **excellent research team** on genetics of sensory defects, with strong links to the local clinical community and patient associations.

Context-related strengths and opportunities

The team includes 13 permanent positions, with 4 full-time researchers, 3 hospital practitioners and 7 engineers, suggesting an excellent critical mass of researchers to perform their research program. Research funding is very good, with 0.8 M€ from or managed by ANR (2 ANR and 1 European grants), as well as MSCA doctoral network (0.3 M€), "programme investissement d'avenir" (0.2 M€) and charities. The research output of the team is very good to excellent, with 40 original articles with first and/or last authorship of a team member, 49 original articles as part of collaborations and 15 clinical papers as collaborations and 3 patents. Publications are in good speciality journals, with highlighted JCI Insight and Molecular Therapy papers. Visibility of the studies are very good. All three PIs publish regularly together.

Context-related weaknesses and risks

The research funding on competitive and european grants (e.g. ANR) could be improved.

ANALYSIS OF THE TEAM'S TRAJECTORY

The team will be reinforced by the recruitment of Dr Jing Wang to develop more research related to auditory deficits and environmental exposure. This is a very interesting development that would allow the team to create its niche on combined auditory and visual deficits. A risk arising from this recruitment is a relative overambitious of the research projects, especially with the inclusion of an environmental axis that brings about new questions and completely different approaches and models. The committee recognizes the interest of this recruitment and fusion of these two groups, while there could be a risk of dispersion.

RECOMMENDATIONS TO THE TEAM

The committee recommends to define common projects and grounds between both PIs to maintain the cohesion of the team and avoid a possible risk of dispersion.

CONDUCT OF THE INTERVIEWS

DATE

Beginning: 15 December 2025 at 08:30

Ending: 15 December 2025 at 17:30

Interview conducted: on-site or remotely

PROGRAMME OF THE INTERVIEWS

8:30-8:45 : Huis Clos du comité en présence de CS Hcéres (Petite salle)

8:45-8:50 Présentation du processus d'évaluation par le conseiller Hcéres et du comité d'experts Grande salle

- **8:50-13:10** Présentation de l'Unité et de ses thématiques de recherche (réunions publiques)

Grande salle

08:50-09:35 : Présentation de l'unité avec les principales réalisations et le projet/la trajectoire par le directeur/futur directeur de l'Unité, **S. Lehmann** et **F. Ango** (30 min de présentation + 15 min de discussion)

09:35-09:50 : Pause

09:50-10:15 : Présentation de la thématique « Audition » Hcéres : **JL. Puel** ; Trajectoire : **R. Noubian** et **E. Valjent** (15 min de présentation + 10 min de discussion)

10:15-10:40 : Présentation de la thématique « Vision » Hcéres : **V. Kalatzis** ; Trajectoire : **V. Kalatzis** et **J. Wong** (15 min de présentation + 10 min de discussion)

10:40-11:05 : Présentation de la thématique « Corticogenesis » Hcéres et Trajectoire : **K. Loulier** (15 min de présentation + 10 min de discussion)

11:05- 11:30 : Présentation de la thématique « Eye » Hcéres et Trajectoire : **F. Michon** (15 min de présentation + 10 min de discussion)

11:30-11:55 : Présentation de la thématique « Proteinopathies » Hcéres : **S. Lehmann** ; Trajectoire : **V. Perrier** (15 min de présentation + 10 min de discussion)

11:55-12:20 : Présentation de la thématique « Neuropeps » Hcéres : **Y. Dauvilliers** ; Trajectoire : **Y. Dauvilliers** et **S. Lehmann** (15 min de présentation + 10 min de discussion)

12:20-12:45 : Présentation de la thématique « Motoneuron » Hcéres et Trajectoire : **C. Raoul** (15 min de présentation + 10 min de discussion)

12 :45-13:10 : Présentation de la thématique « Sensation » Hcéres et Trajectoire : **F. Ango** (15 min de présentation + 10 min de discussion)

13:10- 14:00 Pause déjeuner

14:00- 15:30 : Discussions à huis clos avec les différentes catégories de personnels

Grande Salle

• **14:00- 14:30** : Discussion avec ingénieurs, techniciens, personnels administratifs

• **14:30-15:00** : Discussion avec les étudiants en thèse et les post-docs

• **15:00- 15:30** : Discussion avec les scientifiques (sans les chefs d'équipe)

15:30-16:00 : Réunions à huis-clos du jury pour préparer les échanges/questions avec DU et tutelles (Petite salle)

16:00- 16:30 : Discussion avec la direction (Grande salle)

16:30-17:00 : pause

17:00- 17:30 : Discussion avec les représentants des organismes de gestion/tutelles

Grande salle

17:30-18:00 : Réunion privée du comité de visite en vue de la préparation du rapport (huis-clos)

Petite salle

18:00 *Fin de la visite*

PARTICULAR POINT TO BE MENTIONED

The visiting committee received reports of inappropriate comments regarding the origins of doctoral students and staff. In this context, the establishment of the Ethics, Parity and Integrity Committee (CEPI) during the previous 2019-2024 contract is welcomed. Nevertheless, it is suggested that this committee be expanded to address both ethical and professional conduct issues and the prevention of discrimination and other forms of violence. The revision of the internal regulations, as recommended by the Hcéres visiting committee, should help to consolidate the establishment of these committees and the procedures for appointing their members.

GENERAL OBSERVATIONS OF THE SUPERVISORS



UNIVERSITÉ DE
MONTPELLIER

MONTPELLIER
Le 9 avril 2026

Monsieur Arnaud TOURIN
Directeur du Département d'évaluation de la recherche
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OBJET : Rapport d'évaluation - DER-PUR270025805 - INM - Institut des Neurosciences de Montpellier : déficits sensoriels et moteurs

Monsieur le Directeur,

Je tiens à remercier le comité de visite HCERES pour la qualité de son rapport d'évaluation concernant l'unité de recherche INM - Institut des Neurosciences de Montpellier : déficits sensoriels et moteurs - dirigée par Monsieur Sylvain LEHMANN.

Le directeur de l'unité et moi-même avons pris connaissance des recommandations formulées par le comité de visite.

Vous trouverez ci-après les observations de portée générale du directeur de l'unité.

Nous vous prions d'agréer, Monsieur le Directeur, nos salutations distinguées.

La Vice-Présidente chargée de la recherche

Agnès MIGNOT

Institut des Neurosciences de Montpellier

Référence Hcéres : DER-PUR270025805- INM - Institut des Neurosciences de Montpellier

Objet: courrier d'Observations Générales

Nous avons bien pris note des recommandations et observations du comité, qui nous permettront d'améliorer encore notre démarche scientifique et notre organisation.

Plusieurs remarques du comité, notamment sur des aspects organisationnels, concernent des actions déjà en place ou déployées, mais qui n'ont pas été prises en compte par le comité (voir document de réponse factuel).

Montpellier, le 07/04/2026

Professeur Sylvain LEHMANN,
PU-PH, Directeur d'unité Inserm 1298



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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