Research evaluation

EVALUATION REPORT OF THE UNIT
Institut de l'Audition-IdA

UNDER THE SUPERVISION OF THE FOLLOWING ESTABLISHMENTS AND ORGANISMS:
Institut Pasteur Paris,
Inserm

EVALUATION CAMPAIGN 2023-2024
GROUP D

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High Council for evaluation of research and highter education

In the name of the expert committee[1] :

Pascal, Barone, Chairman of the committee

For the Hcéres[2] :

Stéphane Le Bouler, acting president

Pursuant to Articles R. 114-15 and R. 114-10 of the French Research Code, evaluation reports drawn up by expert committees are signed by the chairmen of these committees and countersigned by the Chairman of Hcéres.

To make the document easier to read, the names used in this report to designate functions, professions or responsibilities (expert, researcher, teacher-researcher, professor, lecturer, engineer, technician, director, doctoral student, etc.) are used in a generic sense and have a neutral value.

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

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Ms Nadia Soussi-Yanicostas

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Etienne Hirsch (Inserm)
Bernard Poulin (CNRS)
Christophe Denfert (Institut Pasteur)
Patrick Trieu-Cuot (Institut Pasteur)

CHARACTERISATION OF THE UNIT

- Name: Institut de l'Audition
- Acronym: IdA
- Label and number: Unité adhoc UA06
- Composition of the executive team: Anne-Lise MAMESSIER-GIRAUD, Director

SCIENTIFIC PANELS OF THE UNIT

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

THEMES OF THE UNIT

The Institut de l'Audition (IDA) is the first research institute in France entirely dedicated to the study of the auditory function and its pathologies. Its approach is translational, combining the fields of integrative neuroscience of hearing in humans and animals with the understanding and diagnosis of hearing pathologies, whether peripheral or central, and the development of preventive and rehabilitative treatments for hearing impairment.

HISTORIC AND GEOGRAPHICAL LOCATION OF THE UNIT

The IDA is a prolongation of the INSERM UA06 unit (Laboratoire d'Innovation en Thérapies de l'Audition) created in 2013 (U1120 for 2013-2017 period, UA06 for 2018-2022 period) and directed by Christine Petit (Prof Institut Pasteur), an expert in genetic forms of deafness. Under the impulsion of the Fondation Pour l'Audition (FPA), which has been working with C. Petit since 2013, an agreement was signed with the Institut Pasteur in 2019 and then joined by Inserm, the Institut de l'Audition was created and opened in February 2020 just before the lockdown linked to the Covid epidemic. The Institut de l'Audition is located in the heart of Paris in a 4000 m² building designed specifically to receive all the fundamental research infrastructures on hearing (experimental rooms and 3 technological platforms) as well as all the conventional communication facilities (reception, information and orientation of the public, conference room...). The CeRIAH clinical exploration platform is located off-site and is currently housed in the historic premises of the Institut Pasteur, where it has a surface area of around 500 m²

RESEARCH ENVIRONMENT OF THE UNIT

The IDA benefits from an extremely dynamic scientific environment, both nearby and in the surrounding area, which is an asset when it comes to exchanges between the IDA and other laboratories and disciplines. The Institute is part of the University Paris-Cité through the Institut Pasteur. It is part of the Neuroscience and Cognition Institute, which brings together some forty neuroscience and cognitive science teams, including the Institut Pasteur's Neuroscience Department, in an interdisciplinary approach. The IDA is part of DIM-C-Brains, a network set up by the Île-de-France region to structure researchers in the broad field of neuroscience. The IDA is also in close proximity to the Institut de la Vision, which is the IDA's counterpart and designed to bring together fundamental, clinical and industrial research on visual function and its pathologies on the same site. Some collaborations and research projects link the two institutes. Links are also mentioned with the ICM (Institut du Cerveau & Moelle) in terms of scientific exchanges, while in terms of the technological environment, the IDA has access to the Neuropsin, CENIR and ICM imaging centres (MRI, EEG, etc.).
In this way, the IDA can become a key player in the auditory neurosciences in the Parisian environment, a role that is likely to be strengthened by the recent IHU re-Connect award, which will boost initiatives in conjunction with the clinicians at Lariboisière Hospital.

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

Catégories de personnel	Effectifs
Professeurs et assimilés	8
Maîtres de conférences et assimilés	2
Directeurs de recherche et assimilés	6
Chargés de recherche et assimilés	10
Personnels d'appui à la recherche	24
Sous-total personnels permanents en activité	**50**
Enseignants-chercheurs et chercheurs non permanents et assimilés	1
Personnels d'appui non permanents	7
Post-doctorants	25
Doctorants	22
Sous-total personnels non permanents en activité	***55***
Total personnels	**105**

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

Nom de l'employeur	EC	C	PAR
INST PASTEUR PARIS	4	8	34
AUTRES	1	1	8
Inserm	0	3	3
UCBL	1	0	3
UNIVERSITÉ BORDEAUX	3	0	1
CNRS	0	4	0
SORBONNE UNIVERSITÉ	2	0	1
Total personnels	**11**	**16**	**50**

GLOBAL ASSESSMENT

The Institut de l'audition (IDA) is a unique laboratory in the French scientific landscape, bringing together ten teams with an original scientific and clinical diversity, whose main objective is to gain a better understanding of the central mechanisms of hearing and its pathologies, whether genetic or neurosensory in origin. Globally, the IDA is an excellent laboratory that is destined to become a key player in hearing research in the future, once the newly integrated teams have committed themselves to a strong research dynamic. The Institute has the resources to meet its scientific objectives, with 27 permanent researchers and 50 research support staff (administrative and technical), as well as three shared technical platforms. The remarkable aspect about the IDA is its outstanding level of funding, which comes from competitive external resources as well as from industrial partnerships, regional institutions and strong support from the Fondation pour l'Audition (FPA), which also financed the building housing the IDA. The level of publication is excellent overall, and in some cases even outstanding, depending on the team. Attractiveness, while being excellent, seems to be one of the weaker points of the IDA, which has not yet really recruited any new young researchers, even though the IDA has been able to attract excellent teams already in place in other laboratories. The links with civil society are excellent, with a correct involvement in teaching and in communication activities aimed at the general public and related to hearing loss, which is an established societal fact. The committee noted disparities between the teams in terms of publication levels, funding and training junior scientists, but overall the committee was able to rank teams' profiles as being from very good/excellent to excellent/outstanding, which indicates an impressive level for the institute as a whole. These differences between teams can be explained by the impact of the Covid crisis on some teams and also by the diversity of the teams in terms of size, years of experience and the disciplines covered.

Overall, the scientific objectives of the various IDA teams are ambitious and clearly defined, developing fundamental and translational research focused on the mechanisms of hearing, covering a broad spectrum of techniques (electrophysiology, anatomy, imaging, behaviour) and scales of investigation (from the cell to the brain network), from animals to humans, including patients. The project is led by a newly appointed management team whose international scientific reputation is a guarantee of success.

Some points of concern were raised by the committee, such as the gender imbalance between the PIs, who are predominantly male, the retirement of internationally renowned PIs, and the dependence on financial support from the FPA, whose renewal is not yet assured in the next plan. However, all of this needs to be tempered by the fact that the recent Re-connect IHU will strengthen the scientific objectives of the IDA, especially in its clinical component.

DETAILED EVALUATION OF THE UNIT

A – CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The previous committee had pointed out a gender imbalance in staff (all categories taken together), which has been taken into account (42% of students, 73% of postdocs and 75% of ITAs are women). Nevertheless, there is still a need for improvement among permanent scientists, who are in the minority (<40% female), particularly PIs (4 out of 11), even though the director of the unit and the deputy director are both women. It was requested that clinical research be strengthened, something that was largely initiated in the past mandate and which should be greatly reinforced by the future re-Connect IHU.
A more dedicated approach to integrated neuroscience was lacking in the previous mandate, and this too has been largely achieved through the creation of teams focusing on the central processes of hearing and its dysfunctions.
One of the concerns raised previously was related to the 'inbreeding' of the research groups. It is clear that the core teams of the previous project were centered around a strong scientific personality who brought the laboratory together. The arrival of new researchers and PIs has repositioned this strong scientific influence, as it is now embedded among new themes and scientific viewpoints. However, it should be noted that several of the new members taking part in this new project have shared the same scientific training and background, which could create a new form of 'scientific inbreeding'.

B – EVALUATION AREAS

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

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

Assessment on the scientific objectives of the unit

The laboratory's objectives are clearly defined, with a twofold mission: firstly, to produce in-depth scientific knowledge of how hearing works, from the peripheral system (the cochlea) to integrated brain levels, and to gain a better understanding of the pathological mechanisms that lead to hearing loss, whether genetic or neurosensory in origin. The IdA's second mission is to transfer this clinical knowledge to develop effective therapies for the rehabilitation of deafness. In both areas, the IdA is developing innovative technological approaches in terms of investigation (optogenetic stimulation, robotics, etc.) and rehabilitation (gene therapy, optical cochlear implants, artificial intelligence). The fundamental scientific objectives are supported by teams of international standard, a by two groups/teams intrinsically composed of clinicians and a functional exploration platform, all of which ensure that the IdA provides cutting-edge translational research in its global scope.

Assessment on the unit's resources

The IdA's human and financial resources are exceptional. The IdA has fifteen permanent researchers (6 CNRS, 6 Pasteur and 3 Inserm), nine teacher researchers (7 PUPH and 2 MCU-PH) and sixteen research support technicians (engineers, assistant engineers, etc.), plus five PH. Permanent researchers can therefore benefit from significant technical assistance, with a ratio of 1:1, which is rare in the French public research system. From a financial point of view, the IDA has shown an outstanding ability to raise funds, with a total of more than €48m over the 2017–2023 period not including recurrent support from institutions. Over the period, the teams have received each between €600K and €12M, which underlines the disparities noted in terms of scientific output.

Assessment on the functioning of the unit

The Institute has grown significantly in terms of staff since 2020, with the arrival of four new teams and the appointment of a new director. These changes coincided with the opening of the new building and have led to a reorganisation of the management committees and research support staff. Several management committees are in place, which separate human resources aspects from scientific aspects and the management of technical platforms. Meetings are held at a fairly frequent schedule, which could make them unproductive if the PIs involved are too busy. The IdA benefits from a deputy director who manages the administrative team, and as well as a management assistant. While the HCERES committee was initially concerned that the IDA steering committee could influence the scientific strategy of the UMR, it became clear that is only has a reporting and information purpose.

1/ The unit has set itself relevant scientific objectives.

Strengths and possibilities linked to the context

The current strengths lie in the arrival of several teams, including the management team, which bring much more integrated topics to the IDA and in which the central mechanisms of hearing and their dysfunction are much better represented than in the original composition. The translational aspects towards clinical research constitute the originality of the IDA and the current work on the molecular aspects and genetics of deafness make it a leading laboratory in this field. Links with the clinic will be strengthened thanks to the recent IHU (Instituts Hospitalo-Universitaires), which will provide a stronger and complementary focus on neuronal aspects. However, it remains to be seen whether the transition from the IDA to the IHU will benefit all the teams, even those whose research is more peripheral. The local environment is favourable to interactions with other disciplines (Institut de la vision, Neurospin, Biocluster Brain & Mind) which allow other methodological approaches (brain imaging; AI) and disciplinary approaches. The IDA has developed strong links with private companies (Cilcare, Sensorion, Echodia, MyMedicalAssistant) that support the implementation of therapeutic rehabilitation projects. These links take the form of direct project funding, technological development or training (Cifre contracts). The most central aspects of research do not seem to be linked to traditional rehabilitation companies (prostheses and implants) and these interactions could be strengthened.

Weaknesses and risks linked to the context

The most critical point concerns the situation of certain PIs involved in fundamental and clinical research who are in the process of retiring. The international reputation and major commitment of these PIs in the creation of the IDA will be missing in the second phase of the IDA and its integration into the IHU re-connect. For the time being, the IDA has not really demonstrated a strong capacity to recruit permanent researchers/teaching researchers from research institutes (Inserm, CNRS). The arrival of external teams funded by the FPA has made it possible to renew the themes, but this strategy remains highly dependent on the support of this Foundation.

2/ The unit has resources that are suited to its activity profile and research environment and mobilises them

Strengths and possibilities linked to the context

Overall, the IDA has the human resources required for its current research activities and, in most cases, for future projects. However, there are disparities between the teams, which will have to recruit researchers to achieve their scientific objectives. One important point is the technical support available to each of the research teams. A range of technical platforms and services (bio-imaging, signal acquisition and analysis, cell culture, molecular biology and biochemistry) are available to cover all the areas of expertise covered. There are 6 technical support staff (engineers, assistant engineers, etc.), representing a ratio of one technical support staff to one researcher, which is exceptional. In addition, there are technicians from private companies (Colin Company, etc.) or external universities (Lyon, Bordeaux) whose role and permanence in the next plan need to be clarified. To date, the IDA has been able to obtain exceptional levels of financial resources, amounting to around 10–15 M€ per year. These resources come from regional, national and international contracts, supplemented by strong support from the Fondation de l'Audition, which has provided each team with substantial funds to help them get their projects launched. The re-connect IHU will provide additional human and financial resources, as well as new infrastructures for clinical explorations.

Weaknesses and risks linked to the context

One of the major points of weakness is the degree of dependence of certain teams on the Fondation pour l'Audition or on the ability to raise international funds. Some teams have not fully demonstrated their ability to obtain funding from competitive calls for projects. The question of extending the Foundation's investment is under consideration and will be an important factor in the Institute's future. One point of vigilance concerns the future of the CERIAH platform, whose current PI is due to retire before the end of the next mandate. The leadership of this platform will be taken over by a PI whose clinical activities are outside the IDA (in Lyon) and by a young researcher whose permanent institutional recruitment is not yet assured. The audiological exploration provided by the CERIAH platform is dedicated solely to control volonteers populations and is notwill be open to patients future CERIAH-Beside plateform who need to be evaluated as part of the IHU. There is a risk that this clinical axis will be slowed down before an operational platform has been set up at the Lariboisière hospital.

3/ The unit's practices comply with the rules and directives laid down by its supervisory bodies in terms of human resources management, safety, environment, ethical protocols and protection of data and scientific heritage

Strengths and possibilities linked to the context

The IDA is organised into several committees with distinct roles in scientific, methodological and human decision-making. The DU is responsible for overseeing all scientific orientations and making formal decisions. She is assisted by a director administrator whose role is more administrative and executive, in conjunction with the technical platforms and research support staff. A steering committee meets every week to define scientific and administrative orientations (budgets, internal life) in conjunction with the Technical Assistance Unit. This committee is supplemented by a technical committee, supervised by the director administrator, to ensure coordination of services. In terms of working conditions, the unit has a health and safety officer in charge of accreditations for the use of regulated products and ensuring compliance with rules relating to laboratory risks. A hygiene and security correspondent is present in each team, and all meet on a monthly basis. At every level, from senior researchers to junior scientists and research support, there is a strong feeling of well-being at work, which reinforces the spirit of cohesion and of belonging within the IdA. This is due to the fact that the workspace is brand new, with recent and modern working facilities. Overall, the IdA is perceived as a welcoming and inclusive unit with excellent facilities by junior researchers and PhD students.

Weaknesses and risks linked to the context

While the IdA directional management is concerned about the gender balanced, especially concerning the PIs (a PI female is actively sought for the next team to be integrated) there is no dedicated committee for inclusion and minorities (while requested by junior scientists). The IdA is geographically distant from the main Pasteur campus which does not allow it to benefit from certain scientific and social interactions. The IdA is made up of technical staff from different administrations (Pasteur, Inserm, University Paris cité) which creates disparities in the links with the human resources administrations of which they belong and in certain cases a certain form of isolation is felt, a point which must be improved. The anonymous survey of support staff was completed by a minority of technicians. The results show that not all of them are similarly involved in research programs, in supervising students or have their own research line.
There is a lack of homogeneity between teams regarding support for PhD students and postdoctoral researchers. Frequency of supervision meetings varies widely, as well as opportunities to publish as first author and to attend conferences.
The committee also noted that there does not seem to be any student, staff, or committee member with a hearing impairment at the IdA.

EVALUATION AREA 2: ATTRACTIVENESS

1/ The unit has an attractive scientific reputation and is part of the European research area.

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

3/ The unit is attractive through its success in competitive calls for projects.

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

Strengths and possibilities linked to the context for the four references above

1 The unit has an attractive scientific reputation and is part of the European research area.
The IdA has a strong international and particularly European attractiveness, as demonstrated by the competitive funding it has received: two ERC, two HFSP, one Marie-Curie grant and two LHW-Stiftung grants. As the coordinator, the IdA also obtained FET Open funding, which brings together a European consortium of scientific laboratories and private partners.
The IdA's scientific reputation is also reflected in the international awards it has received (Louisa-Gross Horwitz Prize – Norway, Award of Merit ARO-USA, Gruber Foundation Neuroscience Prize – USA), including the prestigious international KAVLI PRIZE for outstanding achievement in neuroscience.
The attractiveness of the IdA was particularly evident at its inaugural conference in 2019, which brought together some of the most renowned international researchers in the field of hearing in humans, animals and patients. Support from the Fondation pour l'Audition should allow the IdA to reinforce its attractiveness through an international call for project proposals to join the institute.

2/ The unit is attractive because for the quality of its staff support policy..
The IDA has been able to attract excellent researchers from Parisian laboratories and most of the teams have been created since 2020 by integrating Pasteur, university or CNRS researchers. This policy of integration has been largely made possible by the financial support of the Fondation pour l'Audition, which has invested nearly 8M€ in the form of Starting Grants. This attractiveness is further enhanced by the large number of research support staff, with almost one technician for every regular researcher, as well as the privilege of being able to work in new facilities with modern equipment dedicated to the teams. As a result, the IDA has been able to take on 21 postdoctoral researchers and nine technicians on time-limited contracts, thanks to its exceptional funding. One university professor (Lille Univ.) also requested affiliations to the IDA.
Overall, the IDA is perceived as a welcoming and inclusive unit with excellent facilities by junior researchers and PhD students

3/ The unit is attractive because of the recognition gained through its success in competitive calls for projects.
IDA's strong point is its exceptional ability to obtain external funding. The data provided by IDA allows us to estimate the amount at €28m for the evaluation period alone, and up to 48M€ if we take into account contracts starting before or ending after the evaluation period. This represents approximately 6–8 M€ per year. Added to this is the Fondation pour l'Audition which has provided start-up funds for several research teams (a further 8M€). The IDA's success includes international competitive funding (2 ERC, 2 HFSP, and 2 LHW-Stiftung grants), national funding (8 ANR, 2 ANR-Labex as coordinator), and partnerships with private companies (8 as coordinator) such as Sensorion, Cilcare, and Entendre.

4/ The unit is attractive for the quality of its major equipment and technical skills.
The IDA has an exceptional array of equipment, which is either shared or dedicated to specific teams. The IDA has established three technological platforms, each managed by a dedicated research engineer.

1) a Bio-imaging platform to study samples at different scales. It has 6 microscopes (confocal, electron microscope, 2-photons, etc.) and a technological development department focusing on the development of optogenetic protocols, such as the coupling of 2-photons to a coupled photostimulation and electrophysiology recordings system. A department for the management of the histology and cell culture activities has recently been set up.
2) an animal facility, mainly for rodents, coupled with a phenotyping department equipped with ad hoc equipment for studying animal behaviour and electrophysiological approaches (ABRs, DPOA, Startle reflex, etc.). The animal facility is outsourced to a private company.
3) a Data Acquisition and Neural Signal Processing platform, which is involved in analysing the data generated by the various teams (electrophysiology, behaviour, calcium imaging, etc.) and in developing experimental protocols and analysis systems. It also has cell culture, molecular biology and biochemistry facilities. The IDA's exceptional level of technological equipment is supported by an

exceptional number of technicians for this size of laboratory (47 in total) and an excellent management structure, thanks to a Research Support Pole (POLAR) committee, which provides a link between the departments and the researchers. Ceriah constitutes another platform dedicated to audiological exploration but it is relocated outside the IDA and was presented as a standalone research team.

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

1/ The unit has an attractive scientific reputation and is part of the European research area.
The committee points out that there is little involvement in editorial committees (only 2 PIs listed) and little involvement in scientific societies (apart from an election to the prestigious Académie de Médecine). The IDA benefits from an exceptional level of funding, yet has not set up any programs to host visiting scientists (only 1 postdoc and 1 scientist from UCL-UK). It would also be important to establish links with existing European structures such as the 'Hearing4all' Cluster of Excellence in Germany or its equivalent in other European countries.

2/ The unit is attractive for the quality of its staff hosting policy.
One main weakness is a strong disparity regarding parity in the recruitment of PIs. Further, there is a lack of homogeneity between teams regarding support for PhD students and postdoctoral researchers. Frequency of supervision meetings varies widely, as well as opportunities to publish as first author and to attend conferences. The panel also noted that none of the IDA's students and staff appear to have a hearing impairment, which is surprising but perhaps they have not declared themselves as such.

3/ The unit is attractive because of the recognition gained through its success in competitive calls for projects.
No point of weakness can be mentioned except a disparity between the teams and the uncertainty for certain teams or researchers recently incorporated into the IDA to obtain their own funding.

4/ The unit is attractive for the quality of its major equipment and technical skills.
The IDA has such a level of equipment that it is difficult to find any obvious weaknesses. However, several projects involve Gene therapy based on adeno-associated virus technology and the IDA currently does not have the equipment necessary for virus production, which is outsourced to a private company.

EVALUATION AREA 3: SCIENTIFIC PRODUCTION

Assessment on the scientific production of the unit

The IDA's scientific output is considered excellent in terms of quantity, diversity and quality, but there are clear differences between teams, ranging from 'very good to excellent' to 'outstanding'. However, in view of the financial resources and the level of support for research from which the IDA benefits, the committee considers that the level of production remains excellent but could be greatly improved.

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

2/ The unit's scientific production is proportionate to its research potential and properly shared out between its personnel.

3/ The scientific production of the unit complies with the principles of research integrity, ethics and open science. It complies with the directives applicable in this field.

Strengths and possibilities linked to the context for the three references above

1/ The scientific production of the unit meets quality criteria.
The IDA has an excellent level of production in terms of publications in peer-reviewed journals, patents and software applications. Concerning the publications in peer-review journals, the IDA reports a publication rate of 220 ACL (Please, full name), 20% of which are inter-team publications, and in more than half of these publications a member of the IDA is in a leading position (first or last author). These publications appear in a wide range of multidisciplinary, specialist hearing and clinical audiology journals. Among the numerous publications, some appear in prestigious journals such as PNAS (8 over the period for the same PI), Cell, iScience, Nature communication, Embo, eLife, J. Nrsc…

The IDA has also registered fifteen patents, several of which involve members from different teams, clearly demonstrating the translational nature of the work carried out at the IDA and the strong links with partners outside the purely scientific structures.

2/ The unit's scientific production is proportionate to its research potential and properly shared out between its personnel.
Taking into account all of the permanent PIs, this amounts to around 1.4 articles/year/researcher. This is somewhat higher than the average production rate required of a '*publishing*' researcher, but not particularly exceptional, given the resources available. However, this should be analysed in the light of the fact that some permanent staff joined the IDA during their term of the mandate.

3/ The scientific production of the unit complies with the principles of research integrity, ethics and open science. It complies with the directives applicable in this field.
The IDA's translational research activity extends from animal models to clinical studies for the evaluation and rehabilitation of deafness. The studies conducted at the IDA comply with all animal ethics and personal protection regulations. All these regulatory aspects are applied in accordance with Institut Pasteur's operating methods. This also applies to the Institut Pasteur's open science publication policy, and IDA is claiming a 60% rate of open access publications.

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

1/ The scientific production of the unit meets quality criteria.
There are major disparities between the teams in terms of quality and quantity of publications. Some teams have a lower publication rate, which could be explained by the implementation of cutting-edge methodologies that have not yet been completed. There are a large number of publications involving clearly clinical aspects, in a variety of fields, with multiple authorships, which tends to make the specific scientific direction of these IDA members less visible. There is some dependence on certain PIs for publications in high-impact multidisciplinary journals.

2/ Scientific production is proportionate to the research potential of the unit and shared out between its personnel
Although the publication rate for each permanent researcher is reasonable, this number needs to be put into perspective for a number of reasons. There is weak diversity in the supports for publications for the teams with a strong clinical orientation. For example, a significant proportion appear in the journal of the French ENT Society (Eur Ann Otorhinolaryngol Head Neck Dis) whereas other journals with a more international audience could probably have a greater influence on the ENT community.
There are not enough inter-team publications for an institute dedicated to the study of auditory function and its pathologies. This lack of collaborative publications is also apparent within some of the teams identified with individualised axes of research.
The IDA benefits from an exceptional level of funding and of technical support (staff and platforms). However, the overall level of publications does not exceed that of laboratories of comparable size but with much more limited resources. Having said that, we must nevertheless keep in mind the recent integration of certain teams and researchers, the move to a new building and not overlook the impact of the Covid crisis, which has probably reduced IDA's publication potential.

3/ The scientific production of the unit complies with the principles of research integrity, ethics and open science. It complies with the directives applicable in this field.
The committee did not see any major points of weakness but encourages the unit to increase the open access publication to reach the 100% as proposed in the Pasteur Charter.

EVALUATION AREA 4: CONTRIBUTION OF RESEARCH ACTIVITIES TO SOCIETY

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

Globally, the committee considers that IDA's links with society are excellent but that there is a strong disparity between the teams. The links are mainly due to strong collaborations with some industrial partners involved in the rehabilitation of deafness, to the participation in public events and to a lesser extent in education and teaching.

1/ The unit stands out for the quality and the amount of its interactions with the non-academic world.

2/ The unit develops products for the cultural, economic and social world.

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

Strengths and possibilities linked to the context for the three references above

1/ The unit stands out for the quality and the amount of its interactions with the non-academic world.
Due to its theme strongly focused on deafness, the IDA develops strong interactions with the societal issues of the consequences of hearing loss (Please, give examples). Members of the IDA are involved in the commissions of the French health authorities and participate in the publication of clinical recommendations on the management and rehabilitation of different types of deafness. More importantly, the work of most teams is focused on finding new treatments to treat deafness by improving diagnosis, research into new drugs or gene therapy. The recent integration of two new teams has extended the clinical field to other pathologies such as dyslexia and Alzheimer's disease.

2/ The unit develops products for the cultural, economic and social world.
Within IDA, there are very strong interactions with private companies involved in the development of diagnostic and rehabilitation tools for deafness. As such, there are no less than fifteen patents and inventions filed that cover broad fields, from gene therapy, laser-assisted bioprinting of therapeutic vectors. This link with industrial partners is reinforced by the presence of technicians from the private sector (Collins) and the obtaining of several collaboration contracts with various companies (Sensorion, Cilcare, Entendre).

3/ The unit shares its knowledge with the general public and takes part in debates in society
The IDA is significantly engaged in knowledge transfer by participating in public conferences and scientific public engagement events (Semaine du cerveau, Journée Nationale de l'Audition, UNESCO Week of sound....) with publications in lay-readership journals (e.g., Les Cahiers de l'Audition), the setting up of scientific blog articles and YouTube videos. Some team members also act as consultants for non-profit organisations for patients.
In addition, the IDA organises an international three-week course on hearing and teaches in several Masters (Cogmaster (PSL-UPC), the Master of Biomedical Engineering (PSL-UPC), the Master of Genetics, the master BIP (biologie integrative and physiology, SU), the master of Computational neuroscience (U. Paris Saclay) and one of the Pis teaches at the Collège de France.

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

1/ The unit stands out by the quality of its non-academic interactions.
There is too much disparity between the teams in this area.

2/ The unit develops products for the socio-economic world.
Despite the variety of companies involved, there are surprisingly few links with prosthetic companies and only one Cifre-type funding partnership.

3/ The unit shares its knowledge with the general public and takes part in debates in society
Despite the involvement of several IDA members in several Masters courses, the IDA does not have any teacher researchers who could be more involved in teaching.
The panel hopes that the IDA will continue to be actively involved in the Cogmaster after its forthcoming split.

ANALYSIS OF THE UNIT'S TRAJECTORY

The next plan will be marked by the integration of the IDA into the re-connect IHU project, which is beyond the scope of this committee to evaluate. The re-connect project will bring together the various teams with other hospital departments (ENT and Neurology) in a new building at the Lariboisière hospital, due for completion around 2029–2030. Re-connect will be managed by the current Director of the IDA.

As far as the current teams are concerned, the projects are fully consistent with the work currently being carried out and are focused on understanding the mechanisms of deafness (neurosensory or of genetic origin) with particularly innovative projects including methodological innovations in optogenetics, approaches combining AI and BCi and open to other pathologies (Alzheimer's, dyslexia for example). The trajectory will be marked by the regrouping of certain teams, for example the reunion of the CNSA and DSAPM teams, which will also make it possible to strengthen certain weaknesses and ensure the feasibility of these individual projects. In most cases, the teams have practically consolidated the funds needed to carry out their work, although this condition has not yet been fully met specifically for two teams (PCAC-DCT and ACC). A point of fragility has been noted concerning the ACC team, which will have to integrate a clinical team currently based in Lyon. This integration of a new clinical theme requires the recruitment of a researcher with expertise in experimental audiology to replace a current PI who is highly renowned in the field but close to retirement. For some teams, the relatively small size in terms of permanent researchers is likely to be a little problematic for the realisation of projects and, above all, there is a need to prepare for the replacement of PIs who are close to retirement and who are key scientists in the various future research areas.

Overall, for the IDA project, given that the project relies on clinical populations, feasibility will highly depend on collaboration with local clinicians in Paris ENT services, and this specific point needs to be reinforced as it is not present in the current report.

The committee considers that the overall trajectory of the unit is positive, as it will benefit from the scientific excellence and international reputation of the current and future director of the IDA, who will be able to direct the expertise of each team towards common scientific and clinical objectives.

RECOMMENDATIONS TO THE UNIT

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

In terms of organisation, the IDA will need to ensure the smooth replacement of retiring PIs and redress the gender balance.
Regarding the hosting policy, to improve homogeneity across teams the panel recommends (i) a mentorship scheme, with a mentor being outside the supervision/management team, and a (ii) 'Good practice' pack containing supervision guidelines. The pack could highlight the IDA annual leave/remote work policy, good practice for PhD supervision, etc. It would also be beneficial for each junior researcher (PhD student or postdoc) to be given the opportunity to take part in at least one public engagement activity during their stay at IDA (e.g. blog, YouTube video, lay publication, events with patients).
To address the challenges encountered by international staff and students, the unit could develop a 'Welcome Pack' in English as well as in French, which signposts the administrative steps and HR requirements needed in France. To improve inclusion, this pack could also include information on how to find childcare, disability support, accommodation support (including CAF), medical care, mental health support, etc.
The committee recommends the inclusion of one or several representatives of persons with hearing impairments, to guide the scientific strategy. This/these person(s) could be permanent members of the scientific advisory board or steering committee for instance.
Finally, a Diversity and Equity working group could be created to implement initiatives aimed at improving the inclusion of diverse staff and students.

Recommendations regarding the Evaluation Area 2: Attractiveness

The IDA has demonstrated its excellent attractiveness by creating new teams supported by the FPA. However, given the IDA's exceptional source of funding, it needs to strengthen its recruitment of PhD students and postdocs. On the other hand, IDA is lacking in scientific links with foreign laboratories or centres, and a new policy of hosting foreign researchers needs to be implemented. It would also be important to establish links with existing European structures such as the 'Hearing4all' Cluster of Excellence in Germany or its equivalent in other European countries.

The IDA has demonstrated its ability to obtain competitive European funding (ERC, FET Open), and this must be maintained in the future and extended to a broader group of IDA researchers.
The IDA must build its clinical project on existing resources in Paris and strengthen its interactions with local ENT departments.
Finally, particular attention should be paid to ensure that disparity between teams is reduced in the next period.

Recommendations regarding Evaluation Area 3: Scientific Production

While the IDA has the unique characteristic of bringing together a group of researchers working in the same field but from different angles, the committee has no clear explanation for the weak collaboration between the teams and, even worse, within each team itself. The same weakness was reported in the previous evaluation and has not been successfully addressed. The committee recommends setting up a real collaborative program that is not centered on a single person as in the past. Several measures should be taken to encourage this, such as setting up transversal axes.
The committee recommends that scientific output should be in proportion to the exceptional level of funding that the IDA has obtained or will obtain with the contribution of the newly created IHU. Studies in the domain that are clearly clinical should be published in journals with a wider international audience.

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

The pillars of the IDA's research areas are a clear focus on clinical applications for deafness, and in this respect the institute needs to establish stronger links with patient associations. Some could act as advisors in committees.
The IDA has an excellent development aspect in the form of patent applications, but this should be extended to training by opening up more widely to training courses and Cifre contracts for doctoral students.
IDA researchers should be more involved in teaching, and the recruitment of an EC would provide more effective access to the recruitment of students in the field.
Here again, the unit should aim to reduce disparity between teams on this criterion.

TEAM-BY-TEAM OR THEME ASSESSMENT

Team 1: Neural coding and neuro-engineering of human speech functions

Name of the supervisor: Anne-Lise MAMESSIER-GIRAUD

THEMES OF THE TEAM

The team explores the auditory mechanisms that are at the core of major function of hearing and speech communication. The work of the team focuses on understanding the neural oscillatory mechanisms essential for speech. Using this knowledge, they aim to improve clinical outcomes for several groups of patients. Their work is divided into five axes:

1. Auditory oscillatory functions and information processing.
2. Repair of cortical dysfunctions (using tACS) in individuals with dyslexia and autism spectrum disorder (ASD).
3. Genetic bases of auditory neural oscillatory processes.
4. Decoding inner speech using auditory representations (brain computer interface to restore oral communication in patients).
5. Sensorimotor plasticity in speech acquisition and implications for deafness and stuttering.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The team has been recently created. As such, there are no specific recommendations for this team from the previous report.

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

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

EVALUATION

Overall assessment of the team

The overall assessment of the team is outstanding. The team has ensured very good levels of funding for all the research axes, including a starting grant from FPA and an ANR grant, and recently and IHU grant. The team has access to excellent state-of-the-art facilities, and the multidisciplinary and range of techniques used in their research is internationally outstanding.

Strengths and possibilities linked to the context

The work of the NeuroSpeech focuses on leveraging neural oscillations in hearing, speech, and language to devise innovative treatments. The future research plans of the team have a strong and ambitious translational component, aiming at developing potential therapies or interventions for several groups including individuals with dyslexia, ASD, locked-in syndrome, etc.). The variety of methodological approaches used in the research is internationally outstanding. The team has been very successful at obtaining funding from ANR. to develop all their research axes. In the last five years, the PIs of the team had a strong publication record with 29 publications in peer-reviewed journals. Among these publications, fifteen were signed by team members in last or co-last position, with several published in internationally excellent peer-review journals (Neuron, Journal of Neuroscience, Nature Communications, Elife). The team forges robust interdisciplinary collaborations within France (Lyon, Marseille, Paris) and internationally (Switzerland, the United States, Scotland, Spain), fostering innovation and diverse perspectives in their research. There is a strong translational focus of international excellence, reflected on the research topics, but also on the production of two patents in 2022 (iologo and UNIGE).

Weaknesses and risks linked to the context

There is a clear imbalance in the past scientific production of the two PIs of the team. This is expected due to different career stages, but there is a risk of overreliance and over dominance from the more senior PI. Since the creation of the team, the number of scientific outputs has been significantly reduced, but this is likely due to the time invested in relocating and obtaining the re-Connect IHU funding. As mentioned above, the research plans of the team have a strong and ambitious intervention component, aiming at developing potential therapies or interventions for several groups including individuals with dyslexia, ASD, locked-in syndrome, etc. The committee did not see enough evidence of the involvement of these interest groups in consultations about the research. There is a concern of investing funds in developing therapies that will have poor reception from end-users. This could be avoided by involving these groups at all stages of the research.

Analysis of the team's trajectory

The team's trajectory is on a very positive path and will benefit from the exceptional scientific quality of the team leader. They are using their understanding of speech and neural oscillations to develop therapies for clinical populations such individuals with dyslexia or ASD. Recently, they obtained the ethical approval needed to run a large clinical trial for individuals with dyslexia, which could significantly impact treatment methods. One of the most groundbreaking aspects of their research is their work on a Brain-Computer Interface (BCI) for locked-in or severely dysarthric patients. This BCI aims to interpret the patient's thoughts into sounds or text, opening up new communication possibilities for these patients. The team has already obtained all the necessary funding and established all the collaborations required for the success of this project. The committee highly praises these remarkable efforts in turning fundamental scientific discoveries into practical therapeutic solutions.

RECOMMENDATIONS TO THE TEAM

The panel recommends implementing a plan of action to secure the independence of the more junior PI in the team. It also recommends incorporating discussions and conversations with end-users at all stages of research.

Team 2: Cognition et communication auditive

Name of the supervisor: Luc ARNAL

THEMES OF THE TEAM

The team's scientific focus is the neurobiological mechanisms and circuits underlying human auditory perception, from peripheral to central processing. There are three axes, namely affective brain circuits and auditory salience, hearing impairment and multisensory plasticity, brain rhythms and sequential predictions. Methods used include neuroimaging (in-house electrophysiology and audiology; collaboration with Institute Cerveau Moelle-ICM for functional and structural MRI), computational neuroscience, and patient study (dysfunction in neurodevelopmental and neurodegenerative conditions). Translational research includes the development of diagnostic, assessment, and training tools.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Not applicable as this is a new team created in 2020.

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

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

EVALUATION

Overall assessment of the team

Overall, the profile of this small team (one full time and one part time 0.2 PI) is very good to excellent. The scientific quality is excellent and original, especially in the domain of non-classical auditory pathways (Nature Communications 2019, scientific Prize) and the plans to use AI for assessment. Their publication record is very good to excellent and the team is collaborative, with four articles published with other teams in wide readership journals (Nature communications, PloS Biology), and three in the pre-print stage. Attractiveness is very good to excellent (one postdoc) and PIs are regularly invited to speak at international and national conferences. Regarding funding, the team mainly relied on 'Fondation pour l'Audition' (FPA) for its activities and has very good resources. Some of their work had a high general media impact (e.g. Le Monde) and one patent application is submitted, indicating excellent links with society and a promising upwards trajectory.

Strengths and possibilities linked to the context

During the last period, the main focus has been on salience/affective processing and phonological processing impairments in hearing loss, and neural oscillations. The team also developed a standardised tool to measure audiovisual speech in French. The team's scientific quality was recognised an early career FPA prize awarded to one PI. Overall, the scientific production was very good to excellent, with 7 articles (3 in pre-print stage) as first/last author. One must take into account that the team was recently set up. Three articles have PhD students as 1st author indicating strong training. One article was in a wide appeal journal (Nature Communication 2022). Before that, PIs published eighteen articles, some in top specialist neuroscience (Journal of neuroscience, Neuron, TICS) and wider readership (PlosOne) journals. Attractiveness is very good to excellent. Team members took part in thirteen international conferences (10 as invited speaker) indicating they are recognised in the field, and hosted one postdoctoral researcher. Resources were very good. The team received a starting grant from Fondation pour l'Audition (FPA-800 k), and from other charities (25 k optic 2000) as lead, and co-led two ANR grants. They also received three PhD scholarships (1 CIFRE, 2 Pasteur/Sorbonne) and one postdoctoral fellowship (Fyssen). There were no external national (ANR), international, or European competitive grants obtained as lead. Applications are planned in the next period. Contribution to society was excellent, with strong public engagement (>50 outlets e.g., Times, le temps, New York Times, radio). One article on aversion to harsh sounds (2019) received high media attention (16 news outlets, top 5%). The team has built collaborations with companies (BrainTech MyMedicalAssistant) to develop tools and has been involved in two patents (Alzheimer's and dyslexia treatments). Team members also act as consultants for non-profit organisations.

Weaknesses and risks linked to the context

This is a young and small team that may need to grow and attract postdocs/PIs to reach their ambitious goals across the three axes listed. Its long-term future may be at risk without further external funding.

Analysis of the team's trajectory

The team will merge with two other teams to form the 'Precision audiology and cognition' team, led by one of the PIs. The aim of this new multidisciplinary team is to bridge the gap between audiology and neuroscience to develop new tools to investigate audition and provide solutions to clinical issues. The subgroup formed by the present team will continue the lines of research started at the IDA, and focus on two axes: the first is to use EEG to assess stimulus-driven synchronisation for different hearing pathologies; the second is to better understand the mechanisms underlying predictive processes in auditory perception and apply this knowledge to better predict the outcomes of auditory rehabilitation. While the interactions and collaborations between the different subgroups are not yet obvious, the rationale behind the creation of this larger team is sound and appropriate given the common interests they share around the development of tools with direct clinical applications. As mentioned above, the team will need to leverage external funding to increase their workforce, and ANR/ERC applications are either already submitted or planned. Given that the project relies on clinical populations, feasibility will highly depend on collaboration with local clinicians, as current clinical collaborators are outside Paris. Bearing in mind that the team leader does not yet have significant experience of working with ENT clinicians, the hiring of a team member with a clinical audiology background will be critical.

RECOMMENDATIONS TO THE TEAM

The panel recommends the team builds on recent and most high-profile publications to apply to national, European, or international competitive grants. There is also scope to attract charity funding for product development if tools target certain patient groups. Merging two other teams is an opportunity to broaden approaches, but the panel recommends a more focused and limited research strategy to ensure feasibility and delivery of impactful research outputs within the next period. This will also raise the international profile of the Precision future team. The panel recommends keeping up with a mix of high-impact publications and articles in top tier specialised journals, and collaborations with clinicians locally to achieve the translational objectives.

Team 3: Code Neural dans le Système Auditif

Name of the supervisor: Jérémie BARRAL

THEMES OF THE TEAM

The main objective of the Code Neural dans le Système Auditif (CNSA) team is to understand how the brain perceives and analyses complex sounds. Their research is divided into two main themes. First, they propose to bypass the mechano-transduction process of the inner ear by directly stimulating the inner hair cells using optogenetic techniques and further observing how neural information is processed at more central stages of the auditory system. Second, they aim to develop a cochlear implant that uses optical stimulation in order to provide precise stimulation of the cochlea.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

N/A. This is a young team which was created in 2019 but only obtained lab space in 2020 when the IdA building opened.

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

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

EVALUATION

Overall assessment of the team

This is a small team hosting one PI, one permanent staff and three non-permanent. The team is very good to excellent with promising projects combining cutting-edge approaches (optogenetic) with fundamental and translational goals. The scientific production is very good to excellent with high-impact publications of the PI from past work (Nature Com, 2019), but only one paper from IdA work. The capacity to raise funding is remarkable with success in several competitive calls (CNRS Momentum, ANR). The team also shows very good attractiveness (international students) and diversity (equal gender ratio).

Strengths and possibilities linked to the context

In the past two years, the models and experimental set-ups required to achieve the teams' goals have been successfully developed (expression of ChR2 in inner hair cells, optimisation of fast Chronos variant expression, development of a custom microscope for 2-photon activation, preparation of shaved cochlea, use of a piezoelectric stimulator of the stapes, verification of the quality of neuronal activity recording in the brainstem using Neuropixels probes) (BioRxiv 2023). These developments were a necessary step and exciting scientific

outcomes are to be expected in the coming years. The scientific production has been very good to excellent with publications of the PI and of his postdoc in top journals (Nature Com, eLife). The limited publication track of the team since it is installed at the IdA can be explained by its relatively young existence, the reported difficulties in setting up the lab during the pandemic and the technological challenges that needed to be overcome. One starting package from the Fondation pour l'Audition and three grants have been obtained for a total of about 1,500 k€ over the corresponding period. This amount of funding appears appropriate to perform the planned projects and shows the strong ability of the PI to obtain funding from competitive calls.

Weaknesses and risks linked to the context

The scientific project is ambitious and the human resources appear to be insufficient to achieve these goals. The attractiveness is still limited with one postdoc, one PhD student and one Master student, even if the quality of the collaborations (GeorgiaTech Europe, IRL GT-CRNS 2958, Metz, France & Centre for Nanoscience and Nanotechnology, Paris Saclay University, Palaiseau, France) is favourable to the achievement of the project. The links with the society are very good (lecture on Hearing [PSL], L'enquête des sens : Parle-moi de tes connaissances !, presentation paper in Les Cahiers de l'audition) but could be improved in the future, now that the lab is running.

Analysis of the team's trajectory

The CNSA team will join another team at the IdA (Team 4 Neural codes and dynamics) in which the PI's subgroup will focus on the emergence of subcortical and cortical codes from cochlear processing as well as the development of an optogenetic implant at the cochlear level. The PI subgroup plans to address four different projects. Two of these projects are in the continuity of the current activities. These include the optogenetic stimulation of hair cells to understand the neural code of different stimulus features and the development of an optical cochlear implant. Two additional projects are also presented. They include the development of a theoretical framework of the auditory pathway and two-photon voltage imaging (of hair cells or auditory neurons) to get a spatial map of activation of the tonotopic array in response to sounds. The PI will benefit from the expertise and skills from the hosting team (Hearlight project, optogenetic manipulation of auditory representations with single cell resolution), and from collaborations. The fusion of the teams, therefore, seems reasonable and promising, especially given the methodological approaches the two PIs share. The merger will also benefit from the outstanding scientific expertise and excellent management ability of the future team leader. The trajectory of the team is in line with the scientific developments of these past years and also extends the range of techniques that will be used (e.g. Voltage imaging). The project is sound with appropriate funding resources but may still need to involve more personnel to reach its numerous goals. In that respect, the association with the DSAPM team should facilitate/optimise resource allocation and sharing.

RECOMMENDATIONS TO THE TEAM

In the short term, focusing the research activities on a limited number of topics and taking advantage of the experimental developments that have been made in the past two years would be efficient. In the longer term, the number of researchers working in the team (permanent or not permanent) may need to be increased to achieve the numerous and ambitious goals planned in the research project.

Team 4: Dynamique du Système Auditif et Perception Multisensorielle

Name of the supervisor: Brice BATHELLIER

THEMES OF THE TEAM

The main themes of the Dynamique du Système Auditif et Perception Multisensorielle (DSAPM) team concern the analysis of sensory representations within the auditory system and their role in perception. The team is also working on how sensory representations interact across sensory modalities, including vision and somatosensory processing. They use a wide range of approaches that include two-photon calcium imaging, multichannel electrophysiology, optogenetics, behavioural analysis and computational modelling including the use of deep neural networks.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Although the team was originally created in 2013 at the Paris-Saclay Institute of Neuroscience (NeuroPSI), it only joined the Institute de l'Audition in October 2020. As a consequence, recommendations from a previous report are not available.

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

Catégories de personnel	Effectifs
Professeurs et assimilés	0
Maîtres de conférences et assimilés	0
Directeurs de recherche et assimilés	1
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	0
Sous-total personnels permanents en activité	**1**
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	0
Post-doctorants	4
Doctorants	3
Sous-total personnels non permanents en activité	**7**
Total personnels	**8**

EVALUATION

Overall assessment of the team

The team is excellent, and in many ways outstanding. Despite its very small size, consisting of a single PI who is a CNRS Research Director, 4 postdocs and three PhD students, the team is producing very exciting and innovative research, thanks in part to its excellent funding. Created in 2013 and originally attached to the Institut des Neurosciences Paris-Saclay, it moved to the IdA in October 2020. It is therefore early days for deciding how successful the move has been. However, the trajectory of the team is extremely positive.

Strengths and possibilities linked to the context

The team's overall profile is excellent. The team has a very interesting and original research program that aims to develop computational models of auditory representations across the auditory system and their links with perception. It also studies interactions involving other sensory modalities such as vision, olfaction. The team's scientific production is excellent and even outstanding, with several excellent publications in top journals. Even if we only take into account publications produced at the IdA since 2020, the list includes four in journals that

are among the top 5% in the field – Nature Neuroscience, Science Advances (2); and Nature Communications. The papers from the Saclay period are also excellent, with two published in Elife, another Science Advances, another Nature Communications, a paper in Neuron and a review paper in Current Opinion in Neurobiology. Globally, this is quite outstanding. The team's impressive funding includes an ERC Consolidator Grant in 2017 (DEEPEN project) and a FET Open grant to six teams (Hearlight) where the PI is the main coordinator. Resources are excellent to outstanding. The PI has excellent international visibility, with ten invited talks at international meetings, including four in the USA, two in Switzerland, and others in Germany and Italy. Contribution to society is very good. The PI has given two Public Outreach presentations, has been involved in developing and co-directing a 2.5 week course at the Pasteur Institute called HeaR in 2022 ~~and 2023~~ (out of the period), and gives around 30 hours a year of teaching at the Master's level. In terms of training students, 4 PhDs were successfully defended during the period. The team also has several interesting projects in collaboration with teams based at the Institut de Neuroscience in Montpellier, CEA Neurospin and NeuroPSI in Saclay. Attractiveness is therefore excellent, as is leadership.

Weaknesses and risks linked to the context

The panel noted very few weaknesses with the team, which is clearly focused on high quality fundamental scientific research. That said, we note a couple of public outreach events while there is evidence of links with industry. The other weakness is that currently the team is very small, but this will change in the near future.

Analysis of the team's trajectory

The team looks to be on an extremely positive trajectory. It has excellent support, and the possibilities for strong interactions with other teams at the IdA are very strong and should be encouraged. For the future, the plan is to regroup with the Neural Coding in the Auditory System team to form a new 'Neural Codes and Dynamics' team, with the current PI as the lead. The combined team will share a number of cutting-edge techniques that include optogenetics, non-linear optics, multi-electrode arrays and sophisticated data analysis. Given the outstanding leadership of the PI, the excellent funding, and facilities, this project seems ambitious but achievable within a larger team.

RECOMMENDATIONS TO THE TEAM

The panel recommends that the team continues its excellent trajectory and considers that the fusion with the other team makes excellent sense and should be very productive. That said, even after fusion of the two teams, the number of permanent researchers will remain small. Hopefully, the new team could attract other high quality researchers to join them.

Team 5: Plasticité des Circuits Auditifs Centraux

Name of the supervisor: Nicolas MICHALSKI

THEMES OF THE TEAM

The team is constituted of two groups. One group investigates the molecular mechanisms involved in the development of monogenic deafness and the consequences of peripheral auditory deficits on central auditory systems in the context inherited hearing disorders and neurodegenerative disease. The second one explores molecular mechanisms underlying spatial development of the cochlea with the aim of improving inner ear organoids. Advances in both themes generate targets and tools to develop new therapies.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Recommendations are not available for this team

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

Catégories de personnel	Effectifs
Professeurs et assimilés	0
Maîtres de conférences et assimilés	0
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	3
Personnels d'appui à la recherche	3
Sous-total personnels permanents en activité	**6**
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	0
Post-docs	4
Doctorants	5
Sous-total personnels non permanents en activité	**9**
Total personnels	**15**

EVALUATION

Overall assessment of the team

The team's main contributions to knowledge are the generation of a cochlear single cell transcriptomic atlas and a patent on a DFNB1 gene therapy. The scientific research is excellent. A significant part of original articles is published in top quality journals. The funding is excellent to outstanding with a high capacity to raise external funding. The weakest point is the apparent lack of scientific links and organisational ties between the two groups (PCAC and DCT). The committee considers that the PCAC team is globally excellent.

Strengths and possibilities linked to the context

The team has made an impressive contribution to the auditory research field with a large-scale single-cell transcriptomic atlas for three crucial stages in the maturation of the mouse cochlea (PNAS, 2023). Its advances in deciphering molecular mechanisms involved in genetic forms of deafness has revealed new targets with a high potential for gene therapy. Recent collaborative work exploring cerebrovascular deficits associated with hearing loss discovered a deleterious impact of peripheral auditory deficits on central circuits and systems vulnerable to dementia. The scientific production is excellent with 31 original articles and four reviews (a mean of 2 articles/year/PI), some of them published in top journals (Cell, 3 PNAS, 2 eLife, Nature Communication; Annual Reviews of Neuroscience; Neuroscience and Biobehavioral Reviews). The team's research provided a major contribution to this production (51% with first and/or last author). Innovative tools were developed and

shared with the scientific community (four software and scripts). The funding of PCAC is excellent to outstanding with a total amount of 3,500 k€ mainly levered during the last 4 years. The team shows a high capacity to obtain funding, with roughly two thirds coming from external sources (3 of 5 ANR-PRC as PIs; RNID UK; EMBO, Marie Curie Fellowship; FET OPEN; LHW-Stiftung), and one third from the Pasteur Institute and the Fondation pour l'Audition. Of note, 4 financial supports out of 21 are obtained as partners. The team is engaged in private partnership on its own (Cilcare) and in collaboration with ITAH (Sensorion, BPI France). The team filed two invention declarations, one related to a patent application (Sensorion). The team has an excellent level of attractiveness with eight PhD students and 4 postdocs (50% foreigners). In general, their production is relatively high (usually first authorship for 1 to 3 articles). The team is involved in knowledge diffusion through web pages (5senses4kids foundation, PlanetVie), five articles in local or national newsletters (La Lettre de l'Institut Pasteur ; La lettre des Neurosciences) and a few public conferences (Cité des Science Paris, semaine du cerveau). Globally, the link with the society is very good.

Weaknesses and risks linked to the context

As a main weakness, the PIs need to reinforce their international and national visibility during the next term. International recognition is mainly supported by two highlighted publications, 6 invited conferences at international meetings, and three editorial responsibilities. Most collaborations are internal, and the responsibilities of team members seem to be restricted to the IdA and local perimeter (Pasteur Course, Pasteur's animal Facility, Pasteur and Paris emergence grants reviewing). Of note, among the 35 publications of the team, only 6 were co-signed by PhD students, and five by postdocs. Despite the team's excellent attractiveness, the outcome in terms of production and achievements (articles, first authorship, congress participation, participation to public outreach) of young researchers needs to be improved. Increasing the team's involvement in teaching duties (modest besides a Cours Pasteur responsibility) might increase the pool of recruitment and help select highly talented PhD students. Concerning the HR support and promotion policy, there is a clear imbalance between the situation for permanent positions (1 woman, 5 men) and non-permanent position (7 women, 3 men). Foreigners represent one third of team members and they are all non-permanent members.

Analysis of the team's trajectory

A new team headed by N Michalski will group three teams (PCAC, DCT, IThA) already interacting on several common projects (especially with Sensorion) and sharing many publications. Their complementary expertise in deciphering molecular and functional mechanisms, and producing new models for both basic and preclinical research, provide a fertile ground to develop innovative therapeutic solutions. The retirement of one of its renowned leader in the field represents a potential threat for the team.

Recommendations for the trajectory/project

As the new team results from the merging of three groups (four PIs), the project appears very ambitious. Care should be taken to ensure development and integration of the promising ear organoid model in the team's projects. Although some current funding lasts until 2026, it will be necessary to secure complementary funding in the near future. Otherwise, the team would need to prioritise a limited number of subprojects in order to take full advantage of the potential workforce of the whole team. The management of one PI's retirement must be prepared now (transfer of skills, recruitment,…) to ensure minimal impact on the team's potential.

RECOMMENDATIONS TO THE TEAM

The team is relatively young and more openings towards the international community (event organisation, responsibilities) should enhance the expression of their international reputation, facilitate opportunities to gain international funding, and most importantly maintain the capacity to develop new concepts and ideas essential for maintaining innovative approaches. Encouraging the involvement of its members in teaching and other activities favouring contacts with a larger pool of students may help select the most talented ones. Increasing opportunities for the team's students to expose their work in congress and to participate more often to the publications of the team could also help attract the best students. Some efforts could be done in the recruitment to comply as much as possible with equal opportunity policy.

Team 6: Technologies et thérapie génique pour la surdité

Name of the supervisor: Saaid SAFIEDDINE & Yann NGUYEN

THEMES OF THE TEAM

The main research theme of the team is the study of the mechanisms of sound transduction and auditory deficit rehabilitation using genetic therapy.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Previous recommendations were to increase interactions between the two parts of the team, refocus activities around gene therapy and define more clearly the time devoted by clinicians to the research project. At the time of this evaluation, these recommendations had only been partially implemented.

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

Catégories de personnel	Effectifs
Professeurs et assimilés	2
Maîtres de conférences et assimilés	1
Directeurs de recherche et assimilés	2
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	4
Sous-total personnels permanents en activité	**9**
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	2
Post-doctorants	3
Doctorants	4
Sous-total personnels non permanents en activité	**9**
Total personnels	**18**

EVALUATION

Overall assessment of the team

The team's research focuses on the molecular composition of the auditory sensory cell synapses, the experimental therapies of auditory and vestibular deficits and the cochlear implantation. The quality of scientific research is excellent. The level of publications is excellent to outstanding with the major fraction being clinical work (80%) against basic research (20%). The team has obtained an excellent to outstanding levels of funding. The team's attractiveness is excellent to outstanding. Team members are active in teaching and scientific outreach, which makes its societal interactions excellent to outstanding. It was felt that the weakest point was the persisting apparent lack of interactions between the basic and clinical groups within the team. Overall, the committee considers that the team is globally excellent to outstanding.

Strengths and possibilities linked to the context

The team has a renowned research group at the international level in the field of the molecular mechanisms of sound transduction and auditory deficit rehabilitation using genetic therapy. Thus, the team made significant contributions in identifying the role of the synaptic protein otoferlin in the sensory auditory cells (e-life, 2017). In addition, they developed experimental genetic approaches to rescue auditory deficits in model of human

deafness such as DFNB9 (J Neurosci, 2019; PNAS, 2019) and Usher syndrome (PNAS, 2017). These contributions are important in basic research and proof-of-concept. The team's scientific output is excellent. Between 2017 and 2022, the team published 123 original articles and eight reviews, with 80% of publications related to the clinical part of the team versus only 20% for basic research (22 publications + 5 reviews). The main contributions were published in prestigious journals (first/last authors: J Neurosci., E-life, PNAS; collaborations: Nat communication, JCI). Among major contributions, 50% feature a team member as first or last author. The team is very attractive to students. Indeed, during the reference period, 7 PhD theses were defended, and one is in progress. The team is also hosting three Post-doc. Within the two years following their thesis defence, Ph. D students of the team cumulated five publications/student with 1.75 original article/student in first authorship. The team set up strong collaborations within other groups at the IdA, with both national and foreign labs (Argentina, UK, USA). The team's ability to raise funding is excellent reflected by the five grants obtained: two national grants (ANR), two local grants (starting grant FDA) and one private partnership between 2017–2022 for a total of around 5.4 M€ over the evaluation period. The team filed three patents during the period. Team members have been invited for seventeen oral presentations at 9 international and eight national conferences or seminars. Team members participate in local (IdA), national (Paris) and international scientific meetings (USA, Morocco) on a regular basis. The team's members are involved in teaching (university lectures) and are engaged in significant efforts in knowledge diffusion by participating in several public conferences (national newspapers, TV and radio broadcasts, website) and science popularisation events (Semaine du cerveau, Journée Nationale de l'Audition).

Weaknesses and risks linked to the context

The major weaknesses lie in the apparent lack of interactions between the basic and clinical groups of the team, reflected by the absence of common publications between the heads of both groups. The lack of common work could, in the long term, call into question the structure of the team. Given the large number of clinicians, who have their duty at the hospital, and the retirement age, the PI will be the only one to lead the scientific projects in the team, implying a large burden on his shoulder. The lack of young researchers with permanent position (CNRS, Inserm or Pasteur Institute) is a threat for the team expertise and evolution.

Analysis of the team's trajectory

The previous studies of the team regarding the experimental rescue in auditory deficits led the team to concentrate on the development of gene therapy. The team aims at i) identifying and engineering the most efficient virus to transfect the adult auditory sensory cells, ii) examining the time window for auditory and vestibular rescue in three types of human form of inner ear deficit, iii) characterising the coding along the ascending pathway in the rescue models, iv) improving the cochlear administration routes and cochlear implantation using robotic tools and v) developing treatments against tympanic perforation in the middle ear. The project relies on expertise and collaborations within the IdA and abroad. The trajectory of the team is in line with the previous work and makes its project consistent and suitable in terms of the team's expertise and finances, albeit the last goal is completely apart. At the audition, the team highlighted joint projects between the two sub-teams, which should materialise in the form of publications in the future.

RECOMMENDATIONS TO THE TEAM

The team project in identifying and engineering the most efficient virus to transfect the adult auditory sensory cells is a prerequisite for gene therapy in adult. We advise the team to strengthen their interaction with others teams within the IdA that share the same goal, i.e. the gene therapy, in order to gain in efficiency. The development of common platform within the institute could help in virus engineering and production even if the current externalisation organisation seems satisfactory. In addition, the recruitment of young researchers is mandatory to keep the expertise if the field of cochlear transfection and experimental therapy. The committee encourages the two team leaders in their joint project and management efforts.

Team 7: Laboratoire d'innovation en thérapies de l'audition

Name of the supervisor: Christine PETIT

THEMES OF THE TEAM

The team focuses on the molecular mechanisms of sound transduction in the auditory system, the identification of mechanisms underlying human auditory deficits and the development of therapies. The Auditory Therapies Innovation (IThA) laboratory was established in 2022 as a continuation of the previous work of C Petit's team, but with new objectives: the development of treatments for the prevention and therapy of sensorineural deafness of environmental or genetic origin, and the identification and characterisation of biomarkers for the diagnosis and prognosis of different forms of deafness, notably in collaboration with CERIAH. The two models currently being studied are the most frequent form of genetic deafness (linked to the GJB2 gene) and deafness induced by acoustic trauma (in collaboration with IRBA).

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The recommendations of the previous assessment were to continue along the same outstanding trajectory, and to consider investing in MOOC and e-learning. The first point was perfectly respected. The second was not, but was not considered negative in this evaluation.

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

Permanent and non-permanent personnel	workforce
Professors and associate professors	1
Lecturer and associate lecturer	0
Senior scientist (Directeur de recherche, DR) and associate	0
Scientist (Chargé de recherche, CR) and associate	0
Research supporting personnel (PAR)	5
Researchers from EPIC and other organisations, foundations or private Companies	0
Subtotal permanent personnel in active employment	**6**
Non-permanent teacher researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	5
Post-docs	4
PhD Students	0
Subtotal non permanents personnel	**9**
Total	**15**

EVALUATION

Overall assessment of the team

The committee considers that the team is globally outstanding. The quality of scientific research is outstanding. The team also has an outstanding scientific production, with published papers with the team leader as senior author in top-ranking, highly visible journals. The team has obtained an outstanding level of funding, excellent attractiveness and outstanding outreach activity. This makes the team a highly renowned research group at the international level.

Strengths and possibilities linked to the context

The team has a renowned research group at the international level in the field of the molecular mechanisms of sound transduction, genetics of auditory deficits as well as in the hearing loss rehabilitation using genetic therapy. Thus, the team made significant contributions in identifying:

i) the structure-function of the hair bundle apparatus (PNAS, 2019),
ii) the role of the synaptic protein otoferlin in the sensory auditory cells (e-life, 2017),
iii) the mechanisms in noise-induced hearing loss (PNAS, 2019),
iv) the genetic causes of presbycusis (PNAS, 2020),
v) the molecular signature in the central auditory interneurons (PNAS, 2017)
vi) and in developing experimental genetic approach to rescue auditory deficit in model of human deafness such as DFNB9 (PNAS, 2019) and Usher syndrome (PNAS, 2017).

These contributions are very important for basic research and proof of concept, and make the team excellent to outstanding. Between 2017 and 2022, the team published 53 original articles with five reviews (some in top-ranking journals: Annu Rev Neurosci., Nat Rev Genet). The major contributions have been published in prestigious journals (first/last author: E-life, JCB, PNAS, JCI; in collaboration: J. Neurosci, EMBO Mol Med., Cell rep, PNAS, Nat commun). Among the major contributions, 57% involve a team member as first or last author. The team shows a strong capacity to train PhD students (3 during 2017–2022) and is hosting six postdoc (with 1 foreigner). Within the two years following their thesis defence, PhD students of the team cumulated 1.3 publications/student but only 0.6 original article/student in first authorship. The team set up collaborations within other groups at the IdA, as well as with national and abroad labs (Argentina, UK, USA). The team's ability to raise funds is remarkable, as evidenced by the grants obtained (6): one ERC advanced grant, one RHU national, one Labex ANR plus charitable grants (2) representing around 2.5 million euros per year. In addition, the team secured two major grants with industry. The team filed four patents during the period. The PI has been invited to lecture at dozens of international conferences and has been awarded the prestigious Kavli Prize in Neuroscience. The PI is involved in teaching (university lectures) and is engaged in significant efforts of scientific outreach by participating in several public conferences (national newspapers, TV and radio broadcasts).

Weaknesses and risks linked to the context

The PI is a pioneer in identifying hearing loss genes, with new genes still to be discovered. The identification of new genes is an area of research in its own right, even if transcriptome studies are mandatory. Understanding molecular processes and defining new therapies could be another area of research, which sometimes overlaps with the research field of other IdA teams. This should be corrected in the trajectory. Moreover, the committee wonders about the PI's future status and involvement in the new team, given that she will not be able to supervise students or apply for funding. This point was raised at the hearing, but the responses did not fully clarify the concerns.

Analysis of the team's trajectory

The PI will join another team at the IdA, headed by M Michalski, in which she will:

i) examine the genetic mechanisms underlying early onset of deafness and presbycusis,
ii) the molecular machinery of hair cell mechanotransduction,
iii) develop new therapeutic strategies using organoids, mouse model of human deafness,
iv) identify the genetic architecture, biomarkers, and potential treatment against the noise-induced hearing loss
v) and explore the cerebrovascular remodelling which can jeopardise the benefit of hearing restoration.

To achieve these goals, the PI will benefit from the favourable environment of its host team and from the expertise of various members of his team and other IdA researchers. The scientific project is in line with the team's previous work, and the committee is confident that it should give rise to major advances.

RECOMMENDATIONS TO THE TEAM

The axis developed in the trajectory may benefit from expertise of team 3 (technologies & gene therapy for deafness), and team 6 (Precision audiology and cognition) for the optimisation of the application in clinic.

Team 8: Déficits Sensoriels progressifs, Pathophysiologie, et thérapie

Name of the supervisor: Aziz EL AMRAOUI

THEMES OF THE TEAM

The team studies the molecular mechanisms of sensory deficits in patients to implementing new therapeutic approaches, focusing on Usher syndrome.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

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

Catégories de personnel	Effectifs
Professeurs et assimilés	0
Maîtres de conférences et assimilés	0
Directeurs de recherche et assimilés	1
Chargés de recherche et assimilés	2
Personnels d'appui à la recherche	3
Sous-total personnels permanents en activité	**6**
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	0
Post-doctorants	3
Doctorants	2
Sous-total personnels non permanents en activité	**5**
Total personnels	**11**

EVALUATION

Overall assessment of the team

The Team seeks to gain a deep understanding of the underlying mechanisms responsible for hearing loss and associated sensory deficits, from the molecular and genetic level to the whole organism's behaviour. The committee acknowledges the team's overall excellence, noting important scientific productivity, including significant contributions to prestigious journals. The scientific quality and the publications of the team are therefore excellent. The team was also excellent to outstanding in obtaining significant funding from national, international agencies, and charitable organisations. The team's efforts to improve scientific outreach are considered excellent. Despite only one PhD being mentioned during the period, the team's attractiveness is deemed very good.

Strengths and possibilities linked to the context

The team was created in 2019 and consists with permanent scientists, including three researchers (including the PI), one PH and 2 technicians) along with non-permanent personnel, comprising two postdoctoral researchers and two PhD students. Despite its relatively small size, the team has made excellent contributions to the field of hearing loss and associated sensory deficits. They have authored a total of sixteen original articles and seven reviews in specialist journals. Notably, 41% of the original articles, totalling seven out of sixteen, were published in prestigious journals with team members serving as either the last author or the first author. The DSP team's significant accomplishments include the identification of crucial genetic targets essential for hearing, such as CLRN1-2, which were published in prestigious journals with team members in senior author positions (EMBO Mol. Med., 2019; J. Clin. Invest., 2018; and Hum. Genet., 2021). Additionally, they have characterised the molecular mechanisms of bundle hair, inner hair cell (EMBO Mol. Med., 2017; PNAS, 2017), and photoreceptor synapses (J.

Cell. Biol., 2017, recommended by F1000) in usher syndrome type-1. These findings significantly increased the visibility of the team, as attested by invitations as speakers in international, national and local meeting for a total of 60 oral presentations as indicated in the portfolio, and their network of collaborators. The scientific quality and the publications of the team are therefore excellent. On the financial side, the team was also excellent to outstanding in securing significant funding from national (ANR, RHU and labex), international agencies (EuronanoMed, LHW and FFB), and charitable organisations (for over 4M€ since 2017). One aspect worth highlighting is the team's active engagement in scientific outreach efforts. The link to society is excellent, the Principal Investigator (PI) has contributed to five book chapters, authored four scientific blog articles, and engaged in six general public communications. Scientific outreach extends to various platforms, including one podcast, two YouTube videos, and the organisation of several meetings bringing together scientists and patients.

Weaknesses and risks linked to the context

There's an ongoing need for bolstering research, training and mentoring efforts. Notably, within the specified period, only one PhD student, successfully defended his thesis in 2020. While this PhD student co-authored three papers in highly prominent journals (as the second author in EMBO Mol. Med., 2019, and as the third author in J. Clin. Inv., 2018, and EMBO Mol. Med., 2017), they did not have any first-author publications. Postdoctoral fellows find themselves in a similar situation. The current evaluation rates the team's attractiveness and competitiveness as very good; however, there are concerns about the team's future attractiveness that need to be addressed.

Analysis of the team's trajectory

The team's trajectory is centred on advancing our understanding of late-onset and progressive hearing loss, with a specific focus on genetic factors (axe I), external influences such as noise exposure and aging (axe 2), and exploring potential therapeutic options (Axe 3). This new line of research is builds upon their earlier findings concerning Clrn1 and -2 genes and encompasses the study of hearing, balance, and vision deficits, as these aspects are all affected in Usher syndrome. The project is excellent and aligns seamlessly with the team's recent scientific achievements. The risk is therefore well balanced. The first two axes will require several mouse models, the use of OMICS and prediction algorithm to investigate cellular and molecular mechanisms. The third axe is dedicated to potential gene therapies using viral approaches. The project seems to have sufficient financial and human resources, and the principal investigator demonstrates a strong capacity to carry it to success.

RECOMMENDATIONS TO THE TEAM

The team's path towards investigating gene therapies through viral techniques will draw upon the knowledge and skills of various other teams within IdA, particularly Team 3 (focused on technologies and gene therapy for deafness) and Team 6 (specialising in precision audiology and cognition). A collaborative effort may be essential to enhance and refine the methodological approaches for this endeavour.

Team 9: Exploration clinique et translationnelle des synaptopathies auditives

Name of the supervisor: Didier Dulon & Hung Thai-Van

THEMES OF THE TEAM

The main research theme of the team is the improvement of the diagnosis and clinical rehabilitation of neuropathies and synaptopathies of the inner ear.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

N/A

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

Catégories de personnel	Effectifs
Professeurs et assimilés	3
Maîtres de conférences et assimilés	1
Directeurs de recherche et assimilés	1
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	5
Sous-total personnels permanents en activité	**10**
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	0
Post-doctorants	2
Doctorants	1
Sous-total personnels non permanents en activité	**3**
Total personnels	**13**

EVALUATION

Overall assessment of the team

The overall assessment of the team is very good to excellent. The team includes clinicians and researchers, located on several sites (Paris, Lyon, Bordeaux). It develops a translational research activity exploring the vestibular impairments associated with deafness, developing new methods of auditory pathologies and associated disorders (neuropathy spectrum disorders, hidden deafness, and central auditory processing disorders); an additional axis focused on language development in children with typical development, neurodevelopmental dyslexia and developmental language disorder.

Strengths and possibilities linked to the context

In the field of fundamental research, the team has produced new data concerning the function of otoferlin isoforms in synaptic transmission, the role of Usher proteins in hair cell ribbon synapses functioning, especially Clarin one, and the adaptation of synapse with aging. This led to a publication rate very good to excellent with over 50 peer reviewed articles published during the period in prestigious journals (J. Neuroscience, e-Lfe) or in large-audience clinical specialised journals (J. clinical Medicine, Eur Ann Otorhinolaryngol Head Neck Diseases). The capacity to get funding is very good to excellent with grants obtained (Fondation pour l'Audition, SAS Entendre, Research Grant SATT Aquitaine) about 1389 k€ over the corresponding period look adequate to perform the planned projects. In consequence the atractiveity is globally excellent with two postdoc and three PhD students supervised by the team, but not equally allocated between the Lyon and Bordeaux sites. The relationship to society is excellent with the organisation of one national congress, and the participation of numerous members to recommendation or expertise committees influencing policy and society.

Weaknesses and risks linked to the context

The major weakness is the apparent lack of interactions between the two groups of the team, reflected by the absence of common publications between the leaders beside recent conference abstracts. Further, the group leader's part-time involvement in the IdA is an obstacle to more in-depth collaborations. The scientific project was not focused on translational research. However, most of the scientific production concern quite fundamental research and very few about development of new assessment methods of neuropathy. The axis on language development in children is not related to the goals of the team. There is no specific involvement of advice from clinical target groups and end-users at different stages of the research or in specific public engagement activities (e.g. patient advisory boards or focus groups).

Analysis of the team's trajectory

As one of the two PI will be retired soon, the team will join another team, with two PI (Team 6: Precision Audiology and Cognition), to develop new investigation tools to be applied to volunteers or patients seen in the CERIAH platform located in the Pasteur Institute. This includes not only auditory synaptopathy or neuropathy (and correlated disorders), but also auditory processing dysfunction. This trajectory sounds logical, and a feasible project, and future succession (one PI who will be retired in a few years) have been anticipated (one excellent audiologist actually in one outstanding US lab) but not secure which constitutes a threat to feasibility of the clinical axis. Also, location of parts of the teams in a new building on Lariboisiere site is being thought: this facility is mandatory for the success of the project of the new team.

RECOMMENDATIONS TO THE TEAM

Due to the retirement of one of the two group leaders, we can only recommend that the clinical team that will be joining the ACC team strengthens its collaborations with the basic research axis. In terms of publications, these should focus more strongly on journals with a large international audience.

Team 10: CEntre de Recherche et d'Innovation en Audiologie Humaine

Name of the supervisor: Paul AVAN

THEMES OF THE TEAM

The goal of this team is to adapt and extend exploration tools initially developed in animal models and apply them to fine human testing. The Platform CeRIAH aims to host (and already does) multiple research protocols on human participants combining audiological testing and blood sampling to identify genetic and molecular markers of pathological auditory conditions.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

N/A

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

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

EVALUATION

Overall assessment of the team

This is a medium-size team hosting 1.5 PI, three part-time researchers, three permanent technical staff, four postdocs and one visiting fellow. The committee considers the team to be excellent with a clearly motivated translational goal and several large human research protocols already running on the platform. The scientific production of the PI is very good to excellent (10 journal publications in the last four years including 60% as first or last author and three co-authored papers in PNAS).

Strengths and possibilities linked to the context

The CeRIAH Platform is an ambitious project aimed to bridge the gap between basic and clinical auditory research. Its resources are excellent with exceptional research facilities (three audiological booths, one faradised booth), excellent funding (1.1 million in total with participation of the PI in three ANRs, funding by several foundations and from socio-economic actor), adequate support staff (three permanent engineers) and several non-permanent postdoctoral researchers (3–4). The activities of the platform look promising with two large human research protocols already running and five awaiting for ethics approval (with several national and international collaborations). The scientific production of the PI is excellent with ten publications, including three in PNAS. One of these publications (Giraudet et al., 2021) consists of the development of an electrophysiological tool to diagnose auditory nerve dysfunction in animals and humans, thereby illustrating the

scientific approach of the team. Links with the society are also excellent with potential direct applications of the outcomes to hearing health and strong collaborations with socio-economic partners (e.g. Electronique du Mazet for building testing tools).

Weaknesses and risks linked to the context

One weakness is the lack of PhD students involved in the research performed at the CERIAH. The committee also notes that the publications listed for the evaluation period do not include other team members than the PI. Two potential risks have also been identified by the committee. First, the CERIAH can only test volunteers right now and not patients directly addressed by the local ENT departments. This makes the research projects partly dependent on hospital centres. Second, the PI is approaching the end of his career and there is a need to identify the person who could 'take over'. It has to be noted that the IdA has already anticipated that and is trying to recruit an external researcher to fill this position.

Analysis of the team's trajectory

The CeRIAH will merge with two other teams to form the 'Precision Audiology and Condition' team. The aim is to join the efforts of specialists in audiology and in neuroscience to develop new tools to study audition and provide solution to clinical issues. The trajectory of the CeRIAH is promising both because of these potential new collaborations and also given the already planned study protocols that will be achieved (5 protocols in collaboration with several groups including CEA, Univ. Oldenburg, LORIA and on various subjects). The project feasibility is high. Staff and finances appear appropriate to achieve the project goals. The only risk lies in being able to successfully recruit a clinician/researcher to lead the CERIAH activities when the current PI leaves.

RECOMMENDATIONS TO THE TEAM

Given the scheduled retirement of the leading group, it is important to prepare their replacement in the short term in order to ensure the integration of this clinical research area into the IHU project, as this team is the main axis for the study of central auditory dysfunctions.

CONDUCT OF THE INTERVIEWS

Dates

Start: 08 novembre 2023 à 8 h 30

End : 09 novembre 2023 à 18 h 30

Interview conducted : on-site or online

INTERVIEW SCHEDULE

November 8th, 2023
8:30 a.m.-8:45 a.m. Closed session with the committee

8:45 a.m.-9 a.m. Presentation of the committee

9 a.m.-10:00 Presentation of the unit with major achievements and Project/trajectory by the director. C. PETIT & A-L MAMESSIER-GIRAUD (Previous and future DU), 40 min presentation + 20 min discussion with the committee)

10:00-10:30 Presentation of Team# Aziz EL AMRAOUI: Progressive Sensory Disorders. (15′ presentation (ex-post & Project/trajectory) + 15′ questions)

10:30-10:40 coffee break

10:40-11:10 Presentation of Team # Nicolas MICHALSKI: Plasticity of Central Auditory Circuits. (15′ presentation (ex-post & Project/trajectory) + 15′ questions)

11:10-11:40 Presentation of Team # Raphael ETOURNAY: Cochlear Development and Therapeutic Perspectives. (15′ presentation (ex-post & Project/trajectory) + 15′ questions)

11:40-12:10 Presentation of Team # Christine PETIT: Auditory therapies innovation lab. (15′ presentation (ex-post & Project/trajectory) + 15′ questions)

12:10-1:20 p.m. Lunch

1:20 p.m.-2:30 p.m. Private meeting of the visiting committee (Debriefing)

2:30 p.m.-3 p.m. Presentation of Team# Saaid SAFIEDDINE & Yann NGUYEN: Technologies and Gene Therapy for Deafness. (15′ presentation (ex-post & Project/trajectory) + 15′ questions)

3:20 p.m.-3:50 p.m. Presentation of Team # Brice BATHELLIER: Auditory System Dynamics and Multisensory Processing. (15′ presentation (ex-post & Project/trajectory) + 15′ questions)

3:50 p.m.-4:20 p.m. Presentation of Team # Jérémie Barral: Neural coding in the auditory system.
(15′ presentation (ex-post & Project/trajectory) + 15′ questions)

4:20 p.m.-6:30 p.m. Private meeting of the visiting committee (Debriefing & report)

November 9th, 2023

9 a.m.-9:20 a.m. Presentation of Team# Didier Dulon/H. Thai Van: Clinical and translational exploration of sensorineural hearing loss. (10′ presentation (ex-post) + 10′ questions

9:20 a.m.-9:50 a.m. Presentation of Team # Anne-Lise L Giraud: Neuroengineering of Speech Functions. (10′ presentation (ex-post & Project/trajectory) + 15′ questions

9:50 a.m.-10:20 Presentation of Team # Luc Arnal. Auditory Cognition and Communication. (15′ presentation (ex-post & Project/trajectory) + 15′ questions)
10:20-10:50 Presentation of Team # Paul AVAN: Centre for Research and Innovation in Human Audiology. (15′ presentation (ex-post & Project/trajectory) + 15′ questions)

10:50-13:30 Private meeting of the visiting committee (Debriefing)

1:30 p.m.-2 p.m. Lunch
2 p.m.-2:30 p.m. Meeting with engineers, technicians and administrative personnel in French

2:30 p.m.-3 p.m. Meeting with students and postdocs

3 p.m.-3:30 p.m. Meeting with scientists (Researchers and teacher researchers), no team leaders, no lab director

3:30 p.m.-4 p.m. Meeting with team leaders

4 p.m.-4:30 p.m. Private meeting of the visiting committee

4:30 p.m.-5 p.m. Discussion with the unit director Ms. A-L MAMESSIER-GIRAUD

5 p.m.-5:30 p.m. Discussion with the representative of the funding bodies (Etinne Hirsch (Inserm), Bernrd Poulin (CNRS), Institut Pasteur (Christophe Denfert & Patrick Trieu-Cuot)

5:30 p.m.-6:30 p.m. Private meeting of the visiting committee (report preparation, closed-door)

PARTICULAR POINT TO BE MENTIONED

GENERAL OBSERVATIONS OF THE SUPERVISORS

Institut de l'Audition (IdA) UA06 Inserm unit

GENERAL OBSERVATIONS

on

2018-2022 EVALUATION REPORT BY HCERES

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Global Assessment

Detailed evaluation of the Unit

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

1. Supervisory bodies (tutelles)

As a general observation we would like to remind the committee that our *tutelles* for the past mandate were **only Pasteur and Inserm**, but not UPC and CNRS, explaining for instance that young researchers could only apply to researcher's positions at IDA via Pasteur and Inserm (2 applications/year since 22, 1 preselection). CNRS will join for the next mandate and UPC is part of the IHU funding members, which is expected to facilitate careers at IDA to members of those two Institutions or those who wish to join them. Despite this the IDA has attracted 4 CNRS researchers, recruited one INSERM researcher, and one UPC research engineer.

Recruitments at PI level:

- **Boris Gourévitch** joined in 2016 (CNRS, previous mandate in view of IdA development).
- **Brice Bathellier** joined in 2019 (CNRS).
- **Jérémie Barral** obtained a CNRS position in 2019.
- **Luc Arnal** got an Inserm position in 2021.
- **Sophie Bouton** joined in 2022 (CNRS).

A new research group (Pasteur G5) was planned for a hire after the arrival of the new director. The procedure has been delayed but is currently in its final phase (7 preselected candidates).

Please also note that we have many more excellent requests for joining us than we could possibly accommodate in a relatively small sized building, leading us to be extremely strategic in our recruitment decisions, notably via open calls.

2. CERIAH functioning

The opinion expressed by the committee that CeRIAH only receives control populations (seen as a weakness) is misleading as only about 20% of enrolled volunteers are control subjects. The large majority are recruited among patients followed up by private-practice audiologists, or more seldom by ENTs. The inclusion criteria for enrolling these patients is that they suffer from one of a whole range of sensorineural hearing losses and sometimes balance deficits, and that they agree to the signature of an informed-consent sheet stipulating that they will not benefit from a diagnosis or prescription, since the questions examined by the protocol are research questions with no definite therapeutical consequence. With the IHU, we plan to apply CeRIAH equipment and protocols to the diagnosis and follow up of individual patients seeking medical support (in other practical words, these patients will be charged for the tests they will receive, while as volunteers, they would have received a financial compensation. There is no risk of interference between the two CERIAH sites as they have

been constructed as complementary investigation units operating with distinct models for distinct objectives.

To illustrate the fact that this limitation inherent to RIPH protocols may not be a risk for future clinical projects of the IHU, we would like to stress that clinical measurements are already ongoing for a year, prefigurating the future 'CeRIAH-Mobile', where “patients” are explored within a clinical context, by CeRIAH staff using CeRIAH specialized equipment and novel (yet validated) testing paradigms. Two (admittedly) small samples of patients with rare conditions (n=10 in each case) have been diagnosed in this manner, one in a private practice structure, and one at AP-HP Hospital Tenon in the Internal Medicine clinic. We are thus convinced that pending some minor construction work within two Lariboisière departments, and the enrolment of one or two dedicated nurses, the clinical axis will be ready to start in the first months of the IHU kick-off procedures.

3. Staff with hearing disabilities

The committee remarked that we did not have hearing impaired staff. The IdA does welcome staff with hearing disabilities (a student with profound hearing impairment defended her PhD at IdA in 2021). Many staff at IDA have hearing disorders (hearing aids, severe tinnitus, misophonia), even though they would not necessarily publicize it. Appraising whether the amount of affected people is higher than elsewhere is in itself an interesting issue. We will take active steps to enquire anonymously about the hearing disabilities of our staff, and to give equal chances to disabled people, in particular, to the hearing-impaired.

4. Risks related to a new building at Lariboisière

Back in 2021, the IHU call was kperceived as an immense opportunity to bring our discoveries closer to clinical application and make them useful to the society. Yet, the decision to apply was not easy because of the recency of the IdA and the time and efforts required by members of the IdA, who had all recently moved their labs, to build a both ambitious and realistic project. Retrospectively the application process had strong cohesive effects on the staff and between the direction team and the team leaders. We agree that there is a principled risk of losing cohesion by adding a new building on the Lariboisière site (and a whole new set of clinical and industrial collaborations). However, the building will only be available in 2030, leaving plenty of time to build the project with the IdA as its center of gravity. We acknowledge that the IHU is a real challenge for the IdA and we hope to live up to the expectations the ANR has put in us.

EVALUATION AREA 2: ATTRACTIVENESS

1- The IdA model

We understand that, due to the peculiarities of the IdA model, the staff analysis was a difficult job for the committee. The fact that we have a considerable amount of support staff needs contextualization. We have staff inside the building that is normally within the tutelle (HR, finances, assistants, communication, etc.) and we have a high number of technicians and engineers because two teams are led by PIs who are beyond retirement age whose teams have directly applicative goals that are best fulfilled by technicians and engineers. Computing a simple ratio support staff/researcher is misleading in the context of IdA. We have updated the staff table to clarify this point. Another point of context is that we are hosting platforms that belong to the platform pool of the Institut Pasteur

and are staffed accordingly. These platforms are not used uniformly by all the teams and some teams still need to outsource their research activities without taking benefit from local platforms. A calculation team by team seems more appropriate to evaluate the resources each has at disposal.

2- International collaboration initiatives

We fully agree with the committee that funding should be earmarked for encouraging international collaborations via stays of foreign researchers at IdA. The Fondation pour l'Audition has decided that their grand prix should be accompanied by the opportunity for the recipient to spend a couple of months in a French laboratory. We will thus have the pleasure and honor to host Prof. Barbara Canlon from the Karolinska Institute, recipient of the Grand Prix FPA 2023, during spring/summer 2024. We also welcomed Prof Jenifer Linden from the UCL Ear Institute for a short stay in 2023. Although funding is not yet identified, we will try to encourage international projects.

EVALUATION AREA 3: SCIENTIFIC PRODUCTION

1- Funding vs. productivity

The committee rightfully remarks that the IdA is an extremely well-endowed institute and that one is entitled to expect the output to commensurate with the investment. Owing to the way it was created, at the initiative of a big donator and within the context of the Institut Pasteur, we can only think along with the HCERES committee that the IdA has to prove itself. The generous initial endowment places it in an altogether comfortable and challenging situation. Starting packages were indispensable to attract critical mass of excellent PIs, but the fact that they moved their labs and started all anew is a considerable challenge. As a woman in science, I once computed statistics on my own productivity in relation to maternity and found out that the drops in productivity (including a few *blank* years) were not related to my 4 maternity leaves, but to lab moves. Moving labs and institutions has a tremendous impact on a researcher's productivity. This element of contextualization is aggravated by the fact that the IdA was locked down for the COVID pandemics a few days after its official opening. With all this in mind, I am inclined to consider the IdA current productivity at the term of its first UMR mandate as a considerable achievement. I do hope the committee is sensitive to this contextualization, as a new building and institute is only half a blessing. Getting the other half is a constant effort from all our members.

2- Cross-team publications

The committee rightfully noted that cross-team collaborations remain too scarce. After only three years of exercise, cross-team ANRs and Pasteur PTRs have been obtained, and the related collaborations engaged. It would be very unlikely to witness the materialization of the on-going work in publications before three to four years. To foster cross-team collaborations at junior level, we have launched the IdEA program in 2023, which encourages project involving at least two different teams, PIs excluded. The program has been extremely well attended in its first edition and launched again for a second one. We intend to pursue and adapt this initiative for as long as funding allows.

Team-by-Team Assessment

The commentaries below are made **by the team leaders.**

Team 1 : Neural coding and neuro-engineering of human speech functions (Giraud/Bouton)

We thank the committee for the assessment and for their useful feedback. The weaknesses and risks are legitimate and shared by the PIs. Measures for the autonomy of Sophie Bouton as an independent leader will be taken (e.g. applying for an ERC). Regarding collaborating with end-point users. This is of course an essential concern. The RnDys project arises from an initiative from speech therapists who are seeking science-based automatized treatments as they cannot cope with the demand. The ProSpect project is carried out with and by a young psychiatrist (Dr. Mariette Vinurel) who sees patients in her everyday practice and is solicited for treatments. The riskiest project regarding end-users is the SpeakOut (speech-BCI) project as there is no possible end-user demand for an invasive therapy that does not exist yet. This is made all the more complicated by the fact that the patients who will ultimately benefit from the treatment have severe communication difficulties. This risk is equivalent to for instance the new developments of gene therapy for deafness, which require successful first trials in humans (an ANR for clinical).

Team 2 : Cognition et communication auditive (Arnal/Lazard)

The committee raised the risk of a lack of audiological expertise in the team. Diane Lazard (MD, PHD, ENT specialist) has been co-leading the team for about 4 years. Together with Luc ARNAL (team leader), they have implemented and published several studies focusing on hearing issues: one focusing on brain plasticity in hearing loss with age (Lazard et al., Trends in Hearing 2023), and another one promoting a standardized test to evaluate audio-visual speech intelligibility in French (Helyon 2024). Luc ARNAL has also set up new collaborations with the CeRIAH on the Audiogenage study (Development of a battery of audiological tests for the precise diagnosis of age-related hearing loss) and with MyMedicalAssistant to test how classical audiological tools may bias the estimation of auditory sensitivity in clinical audiograms (Marin et al., currently in review at The Journal of Neuroscience). Regarding the trajectory, Hung Thai Van and other clinical audiologists are joining the team, and there is a fair chance that the team gets reinforced by Stéphane Maison, PhD, MD audiologist, currently in the USA.

Team 4 : Dynamique du Système Auditif et Perception Multisensorielle (Bathellier)

The evaluation obliterates the work of the team on the auditory cortical implant which is a major translational effort to exploit its research efforts on the causal manipulation of the neural code for hearing in the auditory cortex. This research axis started in 2021 and is part of the evaluation period. It is mentioned instead that the team makes no effort towards translation. Although the evaluation states that the PI leads a 6-teams european project (Hearlight) it is not mentionned that the content of the project is the proof of concept for a cortical implant, which has large potential translational applications, as recognized by the European Innovation Council that supports the project.

The team has also strong links with the company Karthala System and co-develops within a funded project (DIM Elicit – project Ultrastim) a novel way of optogenetically stimulate neurons at single cell resolution.

Considering these points, the evaluation of the translational efforts and industrial collaborations should be revised.

The evaluation insists on the small size of the team, describing it as a weakness. This statement is in contradiction with the initial statement that despite its very small size the team has a quite outstanding publication output. It would be fairer to say that addition of new excellent permanent researcher could strengthen further the team, rather than it is weakened by its small size.

Moreover, the strong collaboration between the team and the imaging platform is ignored. One permanent engineer of the imaging platform, Yannick Goulam, contributes largely to the optical developments of the team, mitigating the remark on its small size. The team also intensely collaborates with Clara Dussaux, permanent INSERM engineer, who runs the signal acquisition and processing platform. This further mitigates the fact that the team has only one permanent researcher. The aggregation of knowhow within facilities is a chosen politic of the team and of the institute to foster cross-team synergies.

Strengths and possibilities linked to the context

For the clarity of the evaluation, it seems that there should be here only the adjective "outstanding". It is written below to qualify the scientific output "this is quite outstanding".

Is this evaluation related to the erroneous statement about the lack of collaboration with industry (but see Karthala system) or lack of translational research (but see Hearlight).

Weaknesses and risks linked to the context

This sentence is factually incorrect. The DSAPM teams collaborates since 2020 with Karthala system (DIM IdF Ultrastim project) to co-develop their novel acousto-optic microscope. Moreover, goal (iv) of the team is "iv) to use this knowledge to design novel auditory rehabilitation strategies with implantation of auditory information at the cortical level." This is a 100% translational project started since 2021 with FetOpen / European Innovation Council funding.

This is in contradiction with the above assessment that despite its small size the scientific output of the team is outstanding.

Analysis of the team's trajectory

The leadership is rated above as only excellent. For clarity it would be good to homogenize.

Team 5 : Plasticité des Circuits Auditifs Centraux (Michalski/Gourévitch)

Weaknesses and risks linked to the context

The committee raised the point that the contribution of the team members to teaching and other extra-research activities were essentially turned internally toward the Institut Pasteur. We think that this needs contextualization as two in three PIs are leading a Pasteur career and therefore expected to contribute to the functioning of their institution, which is different for an Inserm or CNRS researchers.

Team 7 : Laboratoire d'innovation en thérapies de l'audition (Petit)

The HCERES document, on the one hand, highlights the prestigious international prizes I have won in recent years and the several million euros in funding raised by my laboratory over the same period, and on the other, refers to an unrelated attractiveness. The explanation for such an unexpected association can be found in the very structure of the innovation laboratory: only fixed-term contracts can be offered; as a general rule, they last no more than 18 months; at any given time, the survival of the Sensorion company with which we work depends on raising funds, and consequently, so does the activity of our laboratory. While the experience of this innovation laboratory has been extremely enriching and productive, the feedback should help to optimise the interfaces between academic laboratories and private companies, which are in great need of it, in particular to minimise the extreme instability of the status of scientists and engineers working in these academic laboratories.

Team 10 : Centre de Recherche et d'Innovation en Audiologie Humaine (Avan)

Weaknesses and risks linked to the context

See above (Point 2, Evaluation area 1, Evaluation of the Unit), the current CeRIAH can welcome patients (80% of our recruitment) provided they volunteer and acknowledge that their exploration will have no individual diagnostic purpose.

INSTITUT PASTEUR

Paris, le 21 juillet 2022

Direction Générale Adjointe Scientifique

De : Christophe d'Enfert

Téléphone : 01 40 61 30 98
E-mail : christophe.denfert@pasteur.fr

Objet : Rapport d'évaluation de l'Unité "Institut de l'Audition – IdA" - DER-PUR250024455

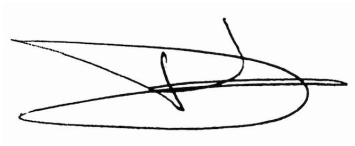
Madame, Monsieur,

Je vous remercie de nous avoir transmis de ce pré-rapport.

Je vous prie de bien vouloir noter que l'Institut Pasteur n'émettra pas de réponse institutionnelle de type « observations de portée générale ».

L'Institut Pasteur remercie le comité HCERES pour le travail d'évaluation qu'il a réalisé et reste à votre disposition pour tout complément d'information.

Bien à vous,



Christophe d'Enfert
Directeur Général Adjoint Scientifique

cc. Anne-Lise Giraud, Patrick Trieu-Cuot, Didier Mazel

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