Research evaluation

EVALUATION REPORT OF THE UNIT

LNCA - Laboratoire de neurosciences cognitives et adaptatives

UNDER THE SUPERVISION OF THE FOLLOWING ESTABLISHMENTS AND ORGANISMS:

Université de Strasbourg
CNRS

EVALUATION CAMPAIGN 2022-2023
GROUP C

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High Council for evaluation of research and higher education

In the name of the expert committee[1] :

Mrs. Véronique Deroche-Gamonet, Chairwoman of the committee

For the Hcéres[2] :

Thierry Coulhon, President

Under the decree n° 2021-1536 of 29th November 2021:
[1] The evaluation reports "are signed by the chairperson of the expert committee". (Article 11, paragraph 2);
[2] The president of the Hcéres "countersigns the evaluation reports established by the expert committee and signed by their chairperson." (Article 8, paragraph 5).

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

MEMBERS OF THE EXPERT COMMITTEE

Chairperson:	Mrs Véronique Deroche-Gamonet, Inserm, Bordeaux
Experts:	Mr Etienne Coutureau, CNRS, Bordeaux
	Mr Philippe De Deurwaerdere, Université de Bordeaux, Bordeaux (Representative of the CNU)
	Mr Yannick Hommet, Inserm, Caen
	Mr Denis Jabaudon, Université de Genève, Genève, Suisse
	Mrs Ellouise Anderson Leadbeater, Royal Holloway University of London, London, Royaume-Uni

HCÉRES REPRESENTATIVE

Mrs Céline Souchay

REPRESENTATIVES OF SUPERVISING INSTITUTIONS AND BODIES

Mr Bernard Poulain, Directeur INSB, CNRS

Mme Valérie Lamour, Vice-présidente Recherche, UNISTRA

Mr Kevin Geiger, Adjoint Délégué Régional, CNRS

CHARACTERISATION OF THE UNIT

- Unit name: Laboratoire de neurosciences cognitives et adaptatives
- Unit acronym: LNCA
- Current label and N°: UMR 7364
- ID RNSR: 201320508P
- Application type: Renewal
- Head of the unit (past contract): M. Jean-Christophe CASSEL
- Project leader (2024-2028) : Mme Chantal MATHIS
- Number of teams: 4
- Composition of the executive team: M. Jean-Christophe CASSEL (director) and Mrs. Chantal Mathis deputy director).

SCIENTIFIC PANELS OF THE UNIT

SVE Life, Health and Environmental Sciences

SVE5 Neurosciences and Nervous System Disorders

THEMES OF THE UNIT

Over the 2016–2021 period, the LNCA was dedicated to an integrated study of the mechanisms of adaptive and pathological cerebral plasticity. Learning and memory and social behaviour were the physiological conditions of interest, while the pathological ones covered neurodegenerative diseases, pathological aging, pain, drug abuse and binge eating.

Levels of analysis ranged from subcellular scale to behaviour, with a focus on epigenetic mechanisms and cognitive processes, respectively.

The research unit encompassed four teams with the following main topics: memory dynamics and epigenetics (**Team 1** – Epigenetics and dynamics of memory systems), genesis and modulation of networks supporting learning (**Team 2** – ENGRAM), abuse of drugs and neuroadaptations (**Team 3** – DNA), and normal and pathological aging of cognition (**Team 4** – Neuropsychology and neurophysiology of normal and pathological aging).

A reorganisation of the unit for the 2024–2028 contract is currently on work at LNCA. It is not the duty of this committee, but of the supervisory bodies, to comment on this ongoing work and proposal for the future.

HISTORIC AND GEOGRAPHICAL LOCATION OF THE UNIT

The Laboratory of Cognitive and Adaptive Neuroscience (LNCA, UMR 7,364) was created on January 1st, 2013, and renewed on January 1st, 2018.

Since 2013, i.e. over the last two contracts, the LNCA has been directed by Jean-Christophe Cassel, professor at the University of Strasbourg. In January 2018, Dr Chantal Mathis, research director at the CNRS, succeeded Dr Christian Kelche (who retired in 2017) as deputy director.

Dr Chantal Mathis is applying as director of the LNCA for the new contract (2024–2028).

The LNCA is spread over three sites: the building of the Faculty of Psychology of the University of Strasbourg (in Strasbourg), part of a CNRS building located on the campus of the Délégation Régionale N° 10 of the CNRS (in Cronenbourg), and part of the Primatology Center (Silabe) of the University of Strasbourg (in Niederhausbergen). These three locations are about ten kilometres apart from each other. Teams 1, 2 and 3 were located in Strasbourg. Team 4 was located in part in Cronenbourg and in part in Niederhausbergen.

RESEARCH ENVIRONMENT OF THE UNIT

The LNCA is integrated into the neuroscience research environment of Strasbourg.
The LNCA is a member of NeuroStra, one of the fifteen Interdisciplinary Thematic Institute (ITI) approved within the framework of the Idex program of the University of Strasbourg (Unistra). Under Unistra, CNRS and Inserm accreditation, ITIs are the Idex-Strasbourg model for the continuation and extension of the early government-granted PIA programs (i.e. Labex), which aim to locally structure research and research-based university training around a policy of excellence.
Created in January 2021, NeuroStra includes ten neuroscience research laboratories and ten technical platforms.
Five members of the LNCA take part to the ITI steering and/or executive boards, including the co-direction of NeuroStra by the LNCA director (JC Cassel).

For all 'omics' approaches, LNCA relies on and works with the GenomEast platform of the IGBMC. LNCA is an associated platform of the recent bioinformatic infrastructure BiGEst, which is linked to the French Institute of Bioinformatics.

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

Permanent personnel in active employment	
Professors and associate professors	4
Lecturer and associate lecturer	7
Senior scientist (Directeur de recherche, DR) and associate	4
Scientist (Chargé de recherche, CR) and associate	5
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	12
Subtotal permanent personnel in active employment	**32**
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	4
Post-docs	4
PhD Students	22
Subtotal non-permanent personnel	30
Total	**62**

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

Employer	EC	C	PAR
Université de Strasbourg	11	0	5
CNRS	0	7	5
Inserm	0	2	0
Total	**11**	**9**	**10**

UNIT BUDGET

Recurrent budget excluding wage bill allocated by parent institutions (total over 6 years)	**928**
Own resources obtained from regional calls for projects (total over 6 years of sums obtained from AAP idex, i-site, CPER, territorial authorities, etc.)	515
Own resources obtained from national calls for projects (total over 6 years of sums obtained on AAP ONR, PIA, ANR, FRM, INCa, etc.)	1920
Own resources obtained from international call for projects (total over 6 years of sums obtained)	972
Own resources issued from the valorisation, transfer and industrial collaboration (total over 6 years of sums obtained through contracts, patents, service activities, services, etc.).	0
Total in euros (K€)	**4335**

GLOBAL ASSESSMENT

LNCA main missions included basic research, training through research, academic teaching, research administration, and research dissemination to society.

The four teams of the LNCA dedicated research to an integrated study of the mechanisms of adaptive and pathological cerebral plasticity. Learning and memory and social behaviour were the adaptive conditions of interest, while the pathological conditions of interest covered neurodegenerative diseases, pathological aging, pain, drug abuse, binge eating.

LNCA is particularly well integrated into, and takes active roles in, the local, regional and cross-border research and training environments. In this context, the LNCA played a major role in the creation (2021) of the NeuroStra ITI, testifying of a successful local integration and visibility. LNCA members contribute to both the steering (as director) and executive committees of NeuroStra.

Testifying to this successful local integration, established local collaborations with INCI (Institute of Cellular and integrative neurosciences – Dir. M. Barrot) and INSERM U1118 (Central and peripheral mechanisms of neurodegenerescence – Dir. L. Dupuis) have produced excellent (Biol Psychiatry, Neuropsychopharmacology) to outstanding impact publications including in generalist journals (Nature Communications, Nature Neuroscience).

Furthermore, at the national level, fruitful collaborations with different teams of the Inserm U1172 – Neuroscience & Cognition – Dir. L. Buée) and collaborations at the international level have been the source of recent remarkable productions both as collaborators (Brain 2019, 2020) or PI (EMBO Mol Med 2018, Cell Metabolism 2021), including one patent.

Regarding outputs, we find other markers of an ascending dynamic. LNCA has been successful in recruitment competitions (2 MCU, 1 CR who eventually declined the CNRS position, 1 Research Engineer, not including a CR newly recruited in 2022). LNCA has also attracted people (1 MCU, 1 CR, 1 Engineer). LNCA recruited or attracted researchers with high profile (1 MCU selected for an interview at ERC 2022 – result pending). Also, LNCA was

engaged in a significant number of international collaborations (25 in total with India, USA, Germany, The Netherlands…) with some leading to high impact publications (Sc Transl Med 2019, Nature Comm 2021) including as PI (Mol Psychiatry 2021). LNCA has been successful in fund-raising. Over the reporting period (2016–2021), LNCA was able to attract a total of 5,095 k€ as PI, and 1,063 k€ as partner, through competitive grants, including four ANR PRC or JCJC, an ERANET Neuron and an ANR-DFG grants, and a US foundation grant (523 k€). The unit has then been able to raise or contribute to raise a mean of 1,026 k€/year to support research projects. Some of these grants run over 2021, up to 2024, and the total is therefore above the available funds for the reporting period.

Involvement in teaching is very important in terms of both teaching duties (about 2100 ETD hours/year) and responsibilities in master/PhD programs, notably through NeuroStra.

The committee has recognised research themes with translational and/or therapeutic potential (epigenetics of neurodegenerative diseases, early markers of AD, brain oscillations as markers and targets for cognitive dysfunctions, cognition in non-human primates). LNCA applies and develops original approaches, new analytical methods (machine-based) and pre-clinical models. The excellence of this research is demonstrated by the high-profile publications cited above, two patents, and the success to project calls.

The committee has not found any themes to be lagging behind in terms of scientific interest.

During the reporting period, the scientific policy has evolved and moved the unit toward the emergence of new objectives with the aim to promote a more integrative research program, already attested to by recent publications (team 1: Wang et al., Mol. Psychiatry, 2021, Team 2: Borcuk et al., BiorXiv, 2021).

DETAILED EVALUATION OF THE UNIT

A – CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

Consideration of the recommendations made in the previous report is evaluated below through measurable data. In general, they have been well taken into account. Some team-specific recommendations are analysed at the team level.

- *To increase and develop collaborative projects across teams.*

Over the evaluated period, collaborative original publications were produced. In total, 11.5% of the total number of original peer-reviewed publications in English (n=113) involved collaborations between teams, as following: six publications (teams 1/2), five (teams 2/1), one (teams 4/1/2), one (teams 3/1). Three teams (2, 1 and 4) have been granted an FRM collaborative research project (2020–2023) with a significant budget (527 k€).

- *Increasing the number of international collaborations will benefit to the unit.*

The committee counted 25 international collaborations with India, The Netherlands, the USA, Germany, Spain, Poland, Hungary, Switzerland, New Zealand, Finland, Denmark, Italy, and Belgium. They concern basic research projects, development of tools (wireless EEG and miniaturised deep brain stimulators for use in water maze and/or group housing) and research on societal health issues (ANSES funded projects). The committee recognises that the collaborations are not evenly distributed across teams but proportionate to the variety of topics within each team, except for team 4 and in particular the pain axis for which collaborations on the scientific question of the team (pain in aging) are limited in number.

- *To increase involvement in international training networks.*

LNCA is a member and takes part in the management of the Neurexnetwork. Besides federating research between French, Swiss and German universities, Neurex federates training through a variety of master/PhD programs to which LNCA contributes and through which it gets visibility. Neurex also organises international events, such as a one-week summer school on 'Advances tools for data analysis in neurosciences' in 2021, thanks notably to two LNCA members. LNCA also contributes to the EUR Euridol Master-PhD program recently created in the context of NeuroPain, one of the three main research themes of the NeuroStra ITI.

- *Take more advantage of the complementary expertise and equipment existing in the unit to develop integrative and transversal research projects.*

Integrative studies have been run from the molecular to the behavioural level (e.g. Wang et al., Mol. Psychiatry, 2021) and transdisciplinarity has been involved by applying computational approaches to neuroscience questioning (e.g. Borcuk et al., 2021).

- *To put efforts into fund-raising and to develop appropriate collaborations to reinforce the feasibility of some aspects of the project.*

Fund-raising at the unit scale has been significant over the reporting period with a total of 5,095 keuros as PI, and 1,063 keuros as a partner, collected over the reported period.

B – EVALUATION AREAS

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

Assessment on the unit's resources

The unit has demonstrated an excellent ability to raise funds, notably through national competitive grants (ANR). The unit has demonstrated an excellent ability to recruit or attract researchers and engineers with high profile (3 MCU, 2 CR, 1 IR). The committee is confident that the LNCA has now set conditions and demonstrated ability to be competitive in European and international grants.

Assessment on the scientific objectives of the unit

LNCA's achievement of its objectives is excellent and attested by publications in high-profile journals as PI and in collaborations, and two patents.
Attesting to a forward-looking perspective, and a refinement of its scientific objectives over the reporting period, the unit has recruited or attracted high-profile researchers whose expertise reinforced the ongoing scientific objectives by bringing new level of analysis, and generated new complementary research objectives.

Assessment on the functioning of the unit

LNCA is spread over three sites and includes a classified building. This can make functioning and structural changes challenging. Despite this, the functioning of the unit is excellent and complies or make all efforts to comply with the regulation of human resources, safety, and protection of scientific assets. The women/men parity is almost exemplary. Regular scientific and technical-administrative meetings involve all members of the unit. Career development is supported. Some simple environmental actions, regarding waste processing for example, could be implemented, at least for educational value.

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

Strengths and possibilities linked to the context

LNCA's activity mainly comprises:

1) research in neuroscience, mainly fundamental, with some translational aspects,
2) university training at all levels,
3) research administration,
4) research and dissemination to the lay public.

The permanent staff consist of 23 researchers [9 full-time researchers (7 CNRS, 2 INSERM), eleven EC (4 PR and 7 MCU) and three IRs with researcher-like activity] and eight research support staff (3 CNRS and 5 Unistra), six being part of the common services.

Regarding local and regional administration of research, the LNCA takes an active part through different bodies. It has been involved in the creation, and is involved in the administration, of NeuroStra, one of the fifteen Interdisciplinary Thematic Institute (ITI) approved within the framework of the Idex program of the University of Strasbourg. Created in January 2021, NeuroStra includes ten neuroscience research laboratories and ten technical platforms. Five members of the LNCA take part to the ITI steering and/or executive boards, including the co-direction of NeuroStra by the LNCA director. The LNCA has also long been involved in the management of the regional trans-border Neurex consortium. LNCA is an associated platform of the recent bioinformatic infrastructure BiGEst, which is linked to the French Institute of Bioinformatics.

LNCA has a strong implication in contract-based research (79% of its budget - 3,407 keuros), 15% of funding are regional, 56% national and 29% international. The dynamic created by NeuroStra will favour an increase in income from calls in the coming years.

Based on its permanent research staff (12 researchers and 11 Lecturers/Professors), over the reporting period, a means of 190 ETD hours of teaching per EC per year (a total of 2100 ETD hours/year) have been delivered and a total of about 25 dissemination activities/year have been produced. Regarding dissemination toward the lay public, as a concrete example, in 2019, 27 activities were produced, including eight by team 1, three by team 2, nine by team 3, five by team 4, one shared activity by teams 1/2/3 and one shared activity by teams 2/1.

Five members of the LNCA have responsibilities in associations of patients or scientific societies, at the national and European levels. At the national level, two members of the LNCA participate to CNU (section 69) or CoNRS (section 26).

Weaknesses and risks linked to the context

Over the reporting period, only eight postdocs contributed to research with two of them leaving after either six or thirteen months.

The number of postdocs in person months per team over the reporting period is imbalanced and two teams are particularly low in this respect: 24 and thirteen per-months for teams 4 and 3 respectively. Post-docs are usually major driving workforces in research.

When including the recurrent budget, the budget per permanent research unit was about 41 keuros/year over the reporting period. If it remains at this level, it might turn out to be insufficient to support the investment that is potentially required for the mentioned new objectives.

EC represent about half of the permanent research staff. This is a major asset for the university training, but the teaching duty of the unit is high (2100 ETD hours per year).

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

Strengths and possibilities linked to the context

The scientific objectives followed over the reporting period were well described during the interview, and relevant with the state of the art of the research field. The research unit works notably on the neuro-adaptations underlying cognitive functions under normal and pathological conditions. Mechanisms are studied through an integrative approach from the subcellular scale to that of the entire organism, including behaviour, through the intermediate levels of circuits and neural systems. Notably, the unit explores how the mechanisms by which the CNS conserves traces of learning and life experiences, but also the dysfunctions of these mechanisms that underlie vulnerability to neuro- and psychopathologies such as Alzheimer's Disease, Huntington's Disease, drug use and eating-related disorders.

The LNCA recruited or attracted four high-profile researchers (3 MCU and 1 CR) over the last years to bring new relevant expertise to their scientific objectives.

The LNCA implemented state-of-the-art techniques (omics: e.g. ChipSeq, RNASeq).

The LNCA implemented state-of-the-art machine learning-based strategies for the evaluation of neural network function in relation to learning processes or as early neural markers in an Alzheimer's disease pre-clinical model. Thanks to this approach, LNCA's members have moved dogmas. In addition as the strategy is applied to concern EEG recordings (i.e. a non-invasive approach), it opens perspectives for translational questioning.

The LNCA is involved in national and local research networks that serve their scientific objectives. Teams 1 and 2 are members of the CNRS GDR 'Mémoire', Team 2 is also a member of the CNRS GDR NeuralNet, and team 3 is a member of the GDR GPCR-Physio-Med, which is now gathered as IRN i-GPCRnet consortium. Beside its implication and integration in the NeuroStra ITI, the research unit is also associated with the FHU Neurogenycs, which both promote local collaborations at both fundamental and clinical levels.

The LNCA is involved in local, national and European training networks that serve their objectives by attracting Master and PhD students. LNCA is a long-lasting contributor and actor of the trinational network of neurosciences Neurex. LNCA is also backed by the European campus Eucor and the European University alliance Epicur. Two teams (3 & 4) belong to the EUR Euridol (created in 2019). The other two teams are heavily invested in the Neuro3P program of NeuroStra, a training program intended for masters and doctoral students, proposed on a graduate school mode along the Neurotime (the processing of time in the brain) and Neurodegen (the neurodegenerative diseases) axes.

Weaknesses and risks linked to the context

Over the reporting period, there was a persisting imbalance between teams in terms of human resources, notably permanent research on human resources.
The unit will have to deal with the retirement of two technicians in the coming years.

Regarding the forward-looking aspect of LNCA's unit policy, scientific objectives that emerged in the recent years require further human and equipment means. The political strategy to secure these means has yet to be implemented and for now, it is not clear how these means will be secured, which could be seen as a risk.

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

Strengths and possibilities linked to the context *(3,000 characters)*

The composition of the unit respects well the principle of parity. Overall, there is 55% female: male balance among permanent staff, with 56% among the researchers, and 54% among the teaching researchers and the research support staff. However, and rather consistent with the general picture in Neurosciences, the balance is in favour of men for PR (75%) and in favour of women for MCUs (71%). Inversely, regarding researchers (Inserm and CNRS), the balance is in favour of women for DR (75%) and only slightly imbalanced for CR (60% of men). Among doctoral students, the sex ratio is to the advantage of women with 68% consistent with female/male ratio within students in life sciences.

Data support that the unit's working conditions are favourable. One C, an IR and an AI joined the unit through mobility, and three other research support staff (1 from Unistra, 2 from CNRS) aimed at doing so but this was eventually not validated by the supervisory authorities for priority reasons.

Data support that the unit's policy regarding career development is supportive. The rate of promotion over the reporting period is important: four permanent members of the research support staff were promoted, one CR was promoted DR, and two MCU were promoted PR.

The unit has written internal regulations that recall the basic rules of the community in the context of work, particularly with regard to working hours, weekend work and working alone conditions.

Regarding prevention, the budget is a limitation (see weaknesses) but the unit is active in implementing prevention measures in accordance with the legislation.

The LNCA teams being spread over three sites makes it particularly critical to have a flexible and secured information system. The unit describes suitable equipment and accurate procedures for the secure storage, backup and use of experimental data.

Weaknesses and risks linked to the context

Not a weakness *per se*, but regarding the postdocs over the reporting period, the female/male ratio was unbalanced toward males (62%). Considering that the domain has more female PhD students than males, this unbalanced ratio is even more unbalanced than it looks like. Overall, however, the number of postdocs was low and so it is not clear whether this is a general pattern.

For new entrants, the unit organises an instruction day per year (in January) regarding safety instructions are given. The committee questions whether this is sufficient considering that not all people join research at that time of the year.

Credits for risk prevention appear difficult to obtain, even when risks are specifically highlighted by the 'comité d'hygiène de sécurité et des conditions de travail' (CHSCT). Considering the specificities of the main research building (i.e. classified building), and the rapid progression of the regulations there is a risk that the work conditions may sometimes not fulfil the legal requirements.

The laboratory well-considered and consistent laboratory information system has a cost. Emerging research objectives will generate new demands in terms of data management and storage. Authorities offer some services, but the unit estimated that the resources available to further develop or simply support existing infrastructure dedicated to data storage and processing are not sufficient.

The unit evokes reduction in carbon footprint by switching off certain obsolete servers, but does not report on simple concrete actions toward energy and resources savings or waste processing.

EVALUATION AREA 2: ATTRACTIVENESS

Assessment on the attractiveness of the unit

The excellent attractiveness of the unit is attested by the effective recruitment or attraction of four researchers (3 MCU and 1 CR, + 1 CR arriving in 2023), and of two IR and 1IE. Also 36 PhD students were recruited over the reporting period.
The number of collaborations (25) and the resulting production in high-profile journals (Nature Comm, Brain, Cell metabolism, Science advances…) attest to the recognition of the expertise of the unit.
Attractiveness to post-doctorates still needs to be worked on, but a Fyssen-funded fellow was a member of team 4.

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

Strengths and possibilities linked to the context

The unit contributes to the construction of the European research area by a strong involvement in European consortia (Neurex, European campus Eucor, European University alliance Epicur, IRN i-GPCRnet), collaborations and services offer (Silabe and CI2N platforms).

The unit's scientific attractiveness is attested by the recent recruitment or attraction of four researchers (3 MCUs and 1 CR), and the recruitment of two IR and 1IE over the period. Also, 36 PhD students were recruited over the evaluated period (2016–2021).
A Fyssen grant was obtained for a post-doc fellow in team 4.
Although unbalanced between teams, the unit has built fruitful, local, national and international collaborations.

Weaknesses and risks linked to the context

Attractiveness has not translated into post-doc recruitment, which remains limited.

Except for team 3, attractiveness has not strongly translated into the hosting of researchers or exchange of students.

The unit has organised or contributed to a limited number of congresses or symposia at the national or European level over the reported period (n=12). It has to be taken into account that the pandemic has strongly reduced this type of activity.

The unit is not accessible to international researchers online, because the website is entirely in French. A website aimed at an international audience increases attractiveness to international researchers and facilitates invitations to contribute to academic bodies, special issues, etc., but this was not available during the reporting period.

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

Strengths and possibilities linked to the context

Facts support that the unit cares about career development of the hosted early career scientists: 70% of the PhD students who have defended (n=26) their thesis during the reporting period have accepted publications; 100% of the post-docs who spent more twelve months in the lab have published, and as the first author.

Weaknesses and risks linked to the context

Although there is always a place for improvement in hosting policy, the committee did not identify weaknesses

There is a risk that budget differences between the teams have induced inequality between PhD students, for example in their opportunities to attend meetings or apply specific costly techniques.

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

Strengths and possibilities linked to the context

LNCA has a strong implication in contract-based research (79% of its budget, not including salaries, for the reporting period - 3,407 keuros). 15% of these grants are regional, 56% national and 29% international.

Over the reporting period, the unit obtained five ANR-funded grants as PI, including an ANR JCJC, an ANR-DFG and an ERA-NET Neuron grant for a total of 932 keuros.

It is notable that, in 2022, a newly recruited MCU obtained a 6th ANR grant as PI and with a significant budget (680 keuros), and a CR (who obtained the ANR JCJC in 2017) obtained the 7th ANR grant as PI with a significant budget (238 keuros).

LNCA's recognition is also attested by the fact they are called as partners for significant grant applications. As examples, the unit contributed to an ANR PRC (ADORASTRAU 2018 – 783 keuros total budget), a member has been granted for, and supervises, an associated International Laboratory (LIA) with a Canadian researcher.
The unit obtained ten grants from charities or associations, including an international one, as PI for a total of 1476 keuros.

Weaknesses and risks linked to the context

There is an imbalance between teams in the number of competitive grants obtained, notably regarding the ANRs, with teams 1 and 2 having obtained seven out of the eight ANR-funded grants cited above.
International grants are still limited in number.

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

Strengths and possibilities linked to the context

The unit attracts collaborations, including with a private partner, through the creation of equipment dedicated to pain-related studies (Thermal Cutaneous Stimulator).
The unit attracts collaborations through the development of the patented MALT tool.
The unit has a strong acknowledged expertise in epigenetics which has attracted collaborations with several national and international academic partners.

Weaknesses and risks linked to the context

Expertise in the unit, notably in epigenetics, is not organized through services that could be accessible to external paying users.

EVALUATION AREA 3: SCIENTIFIC PRODUCTION

Assessment on the scientific production of the unit

The scientific production was excellent with about 115 original publications, eighteen reviews, seven book chapters, and two patents. Studies with members of the unit as first and/or last author was published in high-profile journals (Nature Neuroscience, Nature Comm, EMBO Molecular Medicine, Molecular Psychiatry, Current biology, Journal of Neuroscience). Their expertise allowed the LNCA's members to contribute to a significant number of original publications as collaborators (46% of the total), including in high-profile journals (Brain, Biological Psychiatry, Nature Neurosci, Nature Comm…).

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

Strengths and possibilities linked to the context

Attesting to the quality of the scientific production, a significant number of studies with members of the unit as first and/or last author was published in high-profile journals (Nature Neuroscience, Biological Psychiatry, EMBO Molecular Medicine, Molecular Psychiatry, Current biology, Journal of Neuroscience).

The unit implements integrative research into its main lines of rodent research, exploring physiological and pathological mechanisms of cognitive processes from the molecular to the behaviour levels with state-of-the art techniques.

The unit has a strong expertise in epigenetics, mainly applied to neurodegenerative diseases, and using large-scale state-of-the-art techniques (omics: ChipSeq/RNASeq) in a longitudinal strategy. This has led to

identification of early markers of neurodegenerative diseases published in high-profile journals (Nature Comm 2021).

This expertise has been applied to identify markers of polycystic ovary syndrome, the most frequent endocrinal women pathology (5 to 10% of procreative women). This has led to a patent (methods for diagnosis and treating polycystic ovary syndrome), as well as a publication in a high-profile journal as PI (Cell metabolism 2021).

The unit implements a state-of-the-art machine learning-based method to unbiased detection of electrophysiological correlates of complex spatial learning tasks (BIORXIV/2022/512498).

The unit has a recognised expertise in non-human primate behaviour and cognition, as shown by their recent attractiveness, which further reinforces this pole of research: LNCA recruited a MCU in 2019 with a neuroscience background (who reached step 2 of ERC 2022 – results pending) and a CR CNRS in 2022 with an ethological background. Both have solid publication records (respectively Current Biology 2019, Nature 2020, Nature Comm 2022, and Nature Comm 2020, Sci Rep 2021). A notable production of this research line is patent for a Multitask learning machine with dual RFID detection.

Weaknesses and risks linked to the context

Conferences in international meetings and invitations in renowned institutes appear limited.

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

Strengths and possibilities linked to the context

In total the unit produced about 115 original peer-reviewed publications, eighteen reviews and seven book chapters, in English, over the reporting period. The rate of original publications is very good, and corresponds to about 1.1 original publications/year/research point, according to the way the unit calculated the teams' researcher potential (but see weaknesses).

About 54% of the original articles issued from work led by members of the unit, this % reaching about 70% for one of the teams (team 3), which attests that a significant part of the unit's production is driven by the unit's research and members.

The distribution over the reporting period supports the previously mentioned positive dynamics, with almost twice of the high-profile publications as PI published over the last three years, as compared to the first three years of the reporting period.

Fifty percent of the reviews were published in the renowned and high-profile *Neuroscience and Biobehavioral reviews*.

The unit has developed very fruitful collaborations with local and national teams leading to publications in high-profile journals (Brain, Biological psychiatry, Nature Neuroscience, Nature Communication).

Weaknesses and risks linked to the context

To relate the scientific production to the team's research potential, the unit estimates the research potential of each team based exclusively on the number of permanent C and EC, discarding IR (although acknowledged as people with a research activity profile) and postdocs from this calculation.

There are imbalances between teams, however, with two teams reaching a level of one or less publications per year per research point (as calculated by the unit). This should, however, be balanced with the number of post-doc person months over the reporting period.

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

Strengths and possibilities linked to the context

The unit is progressively integrating the new recommendations in these different domains and the members are well informed on the risks, available tools and changes in bodies' policy.

Regarding research integrity, the unit policy is based on information and supportive discussion of results. A discussion is undertaken to set up a system of digital centralisation of all the data generated in the research unit.

LNCA is engaged into an open science approach, with all raw omics data deposited in official repositories. Whenever possible, works are deposited in an open archive as attested by several publications on BioRxiv.

Weaknesses and risks linked to the context

The committee does not evidence weaknesses or risks on this point.

EVALUATION AREA 4: CONTRIBUTION OF RESEARCH ACTIVITIES TO SOCIETY

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

The inclusion of the unit's research in society is excellent. Researchers are elected members of scientific advisory boards of patients' associations. The unit takes an active part to animal welfare policy. The unit has two patents and developed an instrument prototype in the context of pain research. The unit has an important dissemination activity toward the lay public through various media.

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

Strengths and possibilities linked to the context

Members of the unit are part of boards of French and European associations of patients related to Alzheimer Disease, Huntington Disease and Lewy body disease: Two are members of the European scientific advisory board for three patient associations on Alzheimer Disease. One is a member of the scientific committee of the Association 'Lewy Body disease'. One is a member of the scientific advisory board of the Huntington France Association. One is elected member of the Scientific and Bioethics Advisory Committee (SBAC) of the European Huntington Disease Network (EHDN). The main functions of these scientific boards are to draft project calls and carry out the scientific assessment of the applications, and to assist the association in the organisation of scientific manifestations.

Weaknesses and risks linked to the context

The committee does not evidence weaknesses or risks on this point. If there is an imbalance between teams or members in the contribution to these activities, it is related to their specific expertise.

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

Strengths and possibilities linked to the context

Members of the unit are involved in two patents (2016, 2021) and one transfer of technology agreement to a private company for a memory test (2018).

A team has developed a prototype of TCS (Thermal Cutaneous Stimulator) and validated it for a clinical use in collaboration with a company dedicated to pain research instruments.

Weaknesses and risks linked to the context

There is probably a place for an increased economic valorisation of the unit expertise. As stated by the unit, there is, however, always the risk that the benefit does not exceed the investment cost.

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

Strengths and possibilities linked to the context

The unit has a strong activity of communication toward the lay public. Over the reporting period, about 65 activities were produced of various types (theatre plays, videos, radio drama, radio, TV, lay public articles, workshops, 27 lay public conferences/debates, school conferences…..). The previous report recommended to two teams to increase their contribution in this domain. They have remarkably made this recommendation into account.

Weaknesses and risks linked to the context

The committee does not evidence weaknesses or risks on this point.

C – RECOMMENDATIONS TO THE UNI

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

The committee noticed a respectful, collaborative and benevolent atmosphere between people, and can only recommend pursuing on the same path.

The committee suggests strengthening awareness of opportunities for career development to PhD students.

Covid19 pandemic still affects the unit's life with convivial moments being impacted by distance/size restrictions (lunch time) or simply prohibited (social events). For example, it is a bit of a concern that students have not been able yet to restart a monthly work-orientated social meeting. We realise that this is not the unit's decision, but because of the local restrictions, but the university should be aware that those restrictions have impacted such opportunities, and eventually motivation.

Recommendations regarding the Evaluation Area 2: Attractiveness

The international visibility of the unit could be increased by more participation to international conferences.

Relatedly, the website of the unit is in French and this limits the unit's visibility. In general, Strasbourg's Neurosciences would gain in visibility by building a unique structured portal where researchers, postdocs, masters and PhD candidates would find all neuroscience-relevant information. LNCA could be a driving force through its responsibility in NeuroStra and Neurex.

A service platform based on the strong expertise of the unit in neuroepigenetics could benefit to the unit economically and to further foster its visibility. The committee acknowledges that this would require specific support by the supervisory bodies or the regional political bodies, at least to set up the project.

The unit should make sure that students, in particular PhD students, benefit from the same opportunities independent of the team they belong too, and that imbalance in the budget between teams does not generate possible inequality.

Recommendations regarding Evaluation Area 3: Scientific Production

Increasing dissemination through participation in international meetings and organisation of symposia would help increase recognition of the research results.

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

The committee appreciated, and encourages pursuit of, activities toward society through contributions to patients' associations and communication to the lay public.

The committee appreciated participation in the organisation of research (institutional responsibilities, members of scientific councils or learned societies…), but encourages these types of activities to be more balanced between LNCA's members.

TEAM-BY-TEAM ASSESSMENT

Team 1: Memory dynamics & epigenetics

Name of the supervisor: Mrs Anne-Laurence Boutillier

THEMES OF THE TEAM

The research performed in Team 1 aims at identifying the molecular and cellular mechanisms underlying neurodegenerative disorders, including Alzheimer's disease (epigenetic alterations) and Huntington's disease (epigenetic alterations) and the reuniens and rhomboid thalamic nuclei (functional role in cognition).

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Interdisciplinary research in collaboration with Team 2 was recommended, it is not obvious here.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	1
Lecturer and associate lecturer	1
Senior scientist (Directeur de recherche, DR) and associate	2
Scientist (Chargé de recherche, CR) and associate	1
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	2
Subtotal permanent personnel in active employment	**7**
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	0
Post-docs	2
PhD Students	6
Subtotal non-permanent personnel	8
Total	**15**

EVALUATION

Overall assessment of the team

Team 1 resources are outstanding with three ANR (including an ERANET), a US foundation and two ANSES grants for 2,350 k€ as PI. This supported the provision of three postdoctoral staff, which together with remarkable collaborations (33 partners, 16 international) comfort an excellent to outstanding attractiveness. Production and links to society are excellent to outstanding with high-profile publications as PI (2021: Nat Comm, Mol Psychiatry, Cell Metab; 2018: EMBO Mol Med) or partner (2021: Nat Comm; 2020: Brain; 2019: Nat Neurosci, Sc Trsl Med, Brain), a patent and 30 actions to the lay public.

Strengths and possibilities linked to the context

The team implements an integrative approach from molecular biology to behaviour through system neuroscience, with a strong translational focus. They apply cutting-edge state-of-the-art large-scale molecular techniques (omics applied to epigenetics) and transgenic models (e.g. cell-specific knockdown), as well as well-controlled behavioural analysis and state-of-the-art system neuroscience techniques (chemogenetics, histochemistry-based structural and functional plasticity).

The Team has an excellent to outstanding production with an excellent publication track record with 46 research articles (26 as first or last author) in international peer-reviewed journals (including Nature Comm, Mol Psychiatry, Cell Metab, EMBO Mol Med, BMC Biology, Frontiers in Immunology, J Neurosci) as well as ten review articles, and one patent (2021).

The Team has made strong scientific contributions in epigenetics of neurodegenerative diseases, identifying the region and cell-specific histone acetylation signature of AD (Alzheimer's disease) and HD (Huntington's disease). For HD they have gone into the underlying mechanisms, including in human samples (Cell Rep 2019). In a therapeutic perspective, they, moreover, have targeted epigenetic mechanisms using pharmacological agents (EMBO Mol Med 2018) or environmental manipulations (J Neurosci 2016).

The team has an outstanding level of funding, with three ANR (including the ANR-DFG EPIFUS and an ANR JCJCJ), two ANSES, one grant obtained from an American foundation, as PI, that together brought about 2.347K€. They were also partners of major ANR (783 k€ – ADORASTRAU 2018–2,024) and FRM grants (527 k€).

The team has a remarkable network of national and international collaborators (n=35), including within the clinical world, attested by high-profile publications (e.g. Nature Comm, Nature Neurosci, Brain…).

The team has mentored fifteen PhD students, which all have contributed to publications, or are about to do so.

With two teaching researchers, the team provides the University with a very strong input to the teaching in molecular and systems neuroscience, at every level.

The team appears to have a strong culture of research review prior to publication, and secured bioinformatics support expertise for much of the reporting period. This is key to ensuring research robustness and quality.

A publication strategy has been specifically considered and incorporates a balance of ambition and realism, which is helpful for early career researchers.

The team engages with outreach to the lay public, including to young people, and is actively involved with an internship program for high school students. Their outreach portfolio is strong (30 various actions) without being overbearing. There is also an active contribution to the scientific community through positions in learned societies, ethical panels, scientific councils and grant review panels.

Weaknesses and risks linked to the context

It is unclear how the three different axes of research are coordinated and what the synergetic value is. The reuniens thalamic nucleus topic seems a bit disconnected.

According to the report, there is limited capacity to analyse and store large datasets, which is increasingly necessary as research approaches progress in this direction. This represents a risk linked to the context.

RECOMMENDATIONS TO THE TEAM

The unit would benefit from the provision of IT infrastructure to support storage and analysis of big data.

Team 2: Engram

Name of the supervisor: Mrs Chantal MATHIS

THEMES OF THE TEAM

The research performed in Team 2 aims at investigating the neural circuits of learning and memory in normal and pathological conditions. More specifically, three main research axes were developed:

i) functional and biochemical markers of cognitive decline
ii) understanding the role of the habenula as an interface between cognition and emotion
iii) dynamics of hippocampal oscillatory activity in spatial memory tasks.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The previous committee recommended the team to pursue its effort in using a multi-level and multi-approaches (electrophysiology, behavioural tasks) strategy in order to disseminate in high-profile journals. The team has positively incorporated this recommendation in several solid publications (e.g. Hamm et al., 2017, Science Advances).
The previous committee recommended the team to keep tight its relationships with pharmaceutical companies. During the 2016–2021 period, the collaborations with the pharmaceutical industry have ceased despite the strong effort put by the team. This appears to be the result of the companies' strategy which have drastically decreased or even withdrawn from research into the cognitive assessment to redirect their effort to the search of new pharmacological targets. Also, the project using a double transgenic model of Alzheimer's disease is protected by a specific material transfer agreement which precludes any project with the pharmaceutical industry. The previous committee recommended the team to limit the amount of research axes. This has been very well taken into account, especially given the low level of PhD students in the team during the period. Indeed, the team has decided to momentarily stop two ongoing projects (beneficial effect of environmental enrichment and role of melatonin in learning and memory) in order to focus on other projects (e.g. role of hippocampal rhythms on cognition, role of the habenula in cognition and emotion).

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	1
Lecturer and associate lecturer	2
Senior scientist (Directeur de recherche, DR) and associate	1
Scientist (Chargé de recherche, CR) and associate	3
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	1
Subtotal permanent personnel in active employment	**8**
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	2
Post-docs	2
PhD Students	4
Subtotal non-permanent personnel	8
Total	**16**

EVALUATION

Overall assessment of the team

Over the period, the team has made very good to excellent inputs on the resources, attractiveness, production, and interactions with the society levels. It has provided very strong contributions in each of the proposed research axes and has made a very strong input to the teaching in Neuroscience in general, and in integrative neuroscience in particular.

Strengths and possibilities linked to the context

The ENGRAM team has a very good to excellent track record. The team is recognised for its expertise in multi-level analysis of the neural circuits involved in learning and memory in normal but also in pathological conditions using cutting edge technical approaches (behaviour, chemogenetics, in vivo electrophysiology. The team has made important contributions in each of the proposed research axes. Concerning the normal and pathological aging axis, the team has published (Science Advances). The team has also discovered an important sex difference in the trajectory of the cognitive decline in models of Alzheimer's disease. Concerning the habenula project, the team has also provided the field with a new look at the role of the habenula in emotional regulation of learned behaviours. The contribution of the team is attested by a series of important publications (*Journal of Neuroscience, Science Advances, Cerebral Cortex, Cell reports, Neuropsychopharmacology*….). Ten articles (out of 23) were published as first or last/corresponding authors. During the visit, the committee has noted the dynamics of the advances in the current projects, which will surely provide the field with strong inputs.

The team encourages the technicians to be strongly involved in research, from the conception of experiments to their publication, as shown by several publications, which is a strong point. The team welcomes a guest CNRS researcher with a strong complementary background in computational modelling, and has a very good network of international collaborators (Canada, Switzerland and Germany) which is a good index of the team's very to excellent level of attractiveness.
Beside the scientific production, the team has attracted an excellent level of founding, being PI on national (ANR JCJC, ANR PRC, FRM) and international (ERA-Net Neuron) grants. The team disseminates its knowledge to a very good level. It contributes to both the general public (e.g. Semaine du cerveau, public debates) and specialised audience (symposia and invited talks at conferences).
During the period, the team has mentored two PhD students who recently defended their thesis. It is expected that they will publish their work in the next future. The team has proven in the past to care a lot about publications of students and postdocs, as attested by their very strong records (one PhD student leaving the team with 6 publications and another one with 8).
With three teaching researchers, ENGRAM provides the University with a strong input to the teaching in behaviour and systems neuroscience, at every level.
The team is involved in lifelong training in state-of-the-art stereotaxic procedures and behavioural evaluation of cognitive processes. The team is actively involved in national research institutions, such as HCERES reviewing, CoNRS (section 26), CNU (section 69), and national jury for University technical staff recruitment. ENGRAM researchers are active members of the GDR Mémoires.

Weaknesses and risks linked to the context

Given ENGRAM's large number of researchers and the fact that it has been well funded, it is quite surprising that only two PhD students successfully defended their PhD thesis in the 2016–2021 period. This is a low number given the number of people with HDRs present in the team. This is well acknowledged in the report, and it is expected that articles based on these PhD work will be published in the near future. Also, scientific production is uneven, with a small number of individual researchers accounting for a very substantial proportion of the total, while others contribute much less. Over the last period (2017–2021), some members published less than one publication in average per year, which could be critically low.

RECOMMENDATIONS TO THE TEAM

It is stated that ENGRAM's members will distribute in three new teams in the next project. There is therefore no recommendation since ENGRAM team will not pursue its activity as a team. The committee, however, recommends the next unit direction to ensure that all members of the unit to be in a situation to contribute at a high level to the scientific production of the team.

Team 3: DNA

Name of the supervisor: Mrs Befort Katia

THEMES OF THE TEAM

Team 3 address pharmocodependence and the genetic basis of addictive behaviours, combining complementary expertise of the team members on transcriptomic, epigenetic and behavioural approaches. They particularly focused on the last contract on long-term adaptations of the opioid and endocannabinoid systems, both involved in pain perception, food intake, and addiction.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Four recommendations were made to the team.

1) The scientific production was estimated to be weak and uneven among the team partners. The recommendation was that all researchers of the team should publish papers as the last author to raise her/his international visibility on the topic. They correctly addressed this concern not only by increasing the scientific production but also by being senior authors in most of their articles.
2) It was suggested to improve the international and national academic reputation. It has been slightly improved with the scientific dissemination (journals with higher visibility, e.g. Mol. Neurobiology) and the obtaining of project-based funding. The visibility is also ameliorated with the EUR Euridol favouring the hiring of PhD students. The international activity is still modest (interaction with Canada and the Netherlands).
3) It was noticed that the team had few interactions with its socio-cultural environment and with start-up companies despite the research topic which is highly related to societal questions. Team 3 has strongly developed the interactions with the lay audience with ten significant actions of various natures (Radio, TV, school conferences, lay articles, public debate…) from October 2019 to December 2021, shared among three members with a strong involvement of the team leader. The interaction with a lay audience is still uneven among team members though and interactions with the economic environment are still lacking.
4) Selecting and developing only the most relevant research topic. This recommendation has been addressed.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	0
Lecturer and associate lecturer	1
Senior scientist (Directeur de recherche, DR) and associate	1
Scientist (Chargé de recherche, CR) and associate	1
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	1
Subtotal permanent personnel in active employment	**4**
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	0
Post-docs	0
PhD Students	5
Subtotal non-permanent personnel	5
Total	**9**

EVALUATION

Overall assessment of the team

The team is very good in terms of resources, attractiveness, production, and interactions with the society. Indeed, the team succeeded in getting grants from different sources as PI. The team also developed some collaborations abroad and attracted several PhD students. The team has been productive during the last contract as they published thirteen research articles and three review articles in peer-reviewed acknowledged journals. The team researchers were publishing as last author in most of these publications. The team also developed its interaction with society, notably with a lay audience.

Strengths and possibilities linked to the context

The first strength is the topic that focuses on the neurobiology of drug addiction which is an important burden for the society considering the lack of approved treatment (for cocaine) or limited efficacy of available treatments for most of the drugs of abuse. Team 3 investigates the mechanisms of neuronal plasticity associated with drug or sucrose/food consumption with emphasis on glutamatergic, opioidergic, and endocannabinoid systems. The team also addresses epigenetic mechanisms in drug and food administration. For instance, they reported regional changes of the CB1 receptor in brain structures afferent to the reward system in an obesogenic pre-clinical model (Eur J. Nutrition, 2021). They also demonstrated a spatial reorganisation of the chromatin at the CB1 cannabinoid receptor locus in the hippocampus as well as in the nucleus accumbens of rats after self-administration of cocaine (Mol Neurobiology, 2022).

The level of publication is very good and shows the dynamism of the team with all permanent staff publishing in the first and more often last positions. They took well into account the recommendations of the previous HCERES committee. They published thirteen research articles and three review articles in peer-reviewed, acknowledged journals (Biol Psy; Mol neurobiol; Addiction biology; Genes brain behaviour; Behavioural pharmacology; Neuroscience & Biobehavioral Reviews; Neurosci Lett; Genes; European Journal of Neuroscience; European Journal of Nutrition; Appetite), fourteen of which as a senior author involving all senior members. There are also other scientific dissemination including two book chapters.
It is also noticeable that the level of citations of team 3's original publications testifies of notable visibility and acknowledgement (for example, Genes Brain & Behaviour 2016; n = 22; Molecular Neurobiology 2019, n = 9).

The team interacts with Team 1 notably to develop some technical approaches (De Sa Noguiera D. et al., Molecular Neurobiology). They are using several approaches from biochemistry to the behavioural analyses. The recent use of sophisticated statistical analyses allows the team to strengthen the integrative links of their molecular/cellular data into their neurobiological networks of interest. The team also pays attention to the acquisition of new procedures/knowledge for the permanent staff.
Considering a recommendation of the past reporting, the team has made a major effort in interacting with local and national lay audience which plays in favour of its visibility. Ten significant actions of various nature (Radio, TV, school conferences, lay articles, public debate…) from October 2019 to December 2021, shared among three members, with two members being particularly active to interact with society mostly with conferences (conferences at schools, cordées de la science, etc.).

The team also developed a few local (team 1 of the LCNA, or the other institutes in Strasbourg), national and international scientific collaborations. It is noticeable that the attractiveness is good as they succeeded in hiring several PhD students (3 students defended during the contract and 5 are still doing their PhD), supported by different financial sources.
Despite the small size of the team, they continue to be funded from different agencies/associations. The team succeeded in getting grants (321 k€ of own incomes from 2016 to 2021) as PI (IRESP, FRM, Eurodil…).
The team has organised two meetings and established some interactions with researchers in Canada and the Netherlands. One member occasionally participated as guest editor in the journal Neuroscience and biobehavioral reviews.

Weaknesses and risks linked to the context

The general goal of the past research but also the specific objectives did not appear well defined in the report but were better exposed during the visit. The general lines of research of the team were clearer (aberrant food

consumption, endocannabinoids), and narrowed, but these lines could be more integrated and the general objective better theorised.
The level of grants is correct but it is not sufficient to develop new approaches.
The interaction or collaboration with other researchers exists, notably with the Canada, and it brings up benefit to the scientific activity of the team. It is still fragile, though.
Based on the team size, the team will be reorganised for the 2024–2028 project, but the new members have heavy teaching duties and it might be challenging to combine the mentoring of PhD students (currently 5) and the search of funds to develop the new topics and new technologies.

RECOMMENDATIONS TO THE TEAM

The team will be reorganised for the new contract. It is the occasion to clearly define the scientific question addressed by the team. The collaborations with other researchers are interesting and they could be expanded for the next contract, notably the international collaborations because they are fruitful.

Team 4: Normal and Pathological cognitive aging

Name of the supervisor: Mr. André Dufour

THEMES OF THE TEAM

The work of the Normal and Pathological cognitive aging team follows two main axes. One group of researchers focuses on chronic pain associated with aging, and particularly the link between executive functions such as attentional processes, which may be affected by aging, and the inhibition of pain. This group uses human research subjects. The other group have a particular focus on the cognitive processes underlying decision-making and social behaviour.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

It was previously recommended recruitment should be increased at all levels. This has been very successful in terms of permanent academics, since Team 4 has recruited two MCUs and attracted a third one between 2018 and 2021. There was also attraction of one postdoctoral fellow with autonomous funding (Fyssen fellowship). The PhD students are now well distributed across the themes, and PhD numbers are strong. Effort was devoted to securing funding, including three ANR applications>400K€, one of which was funded (680 K€, PI).

The team has published collaboratively based on the stimulation tools that they have developed, and developed collaborations involving the MALT tool. Involvement in scientific meetings has taken place at the national level, but less so internationally. The team is on an upward trajectory in respect to its outputs and published several papers that are very good to excellent, with some outstanding contributions following new recruitment.

The team participated in outreach activities for the general public or the academic community, involving one researcher in the aging group, and including participation in two movies and a YouTube video. There were also workshops that targeted either professional groups or other academics.

Collaboration between the themes has not improved, but there is no obvious natural overlap and seeking to construct links artificially would not have been productive.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	2
Lecturer and associate lecturer	3
Senior scientist (Directeur de recherche, DR) and associate	0
Scientist (Chargé de recherche, CR) and associate	0
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	1
Subtotal permanent personnel in active employment	**6**
Non-permanent teacher-researchers, researchers and associates	0
Non-permanent research supporting personnel (PAR)	0
Post-docs	0
PhD Students	7
Subtotal non-permanent personnel	8
Total	**15**

EVALUATION

Overall assessment of the team

Team 4 is excellent in terms of attractiveness, evidenced through three new MCU, and attraction of a Fyssen fellow. Accordingly, resources are very good to excellent, including successful funding of a large ANR grant. PhD numbers are strong. Production is very good and is on an upward trajectory, with several very good publications and latterly some excellent ones, although the latter is derived from work carried out externally. The team has developed research tools that facilitate international collaborations, and partnerships with local industry, so their links to society are very good.

Strengths and possibilities linked to the context

As indicated above, the non-human primate team has introduced a new research perspective focussing on the neurobiology of economic choices, through the external recruitment of a new permanent researcher. It is particularly impressive that this recruitment led to receipt of a large ANR grant within a very short space of time. This has clearly rejuvenated the direction of the theme. In the pain-focused group, there have been two new recruitment, expanding a team that is finding diverse applications for its newly developed thermal contact stimulator tool. All three new researchers (who vary in their career stages) have made valuable contributions within the field.

The team has developed technological and methodological advancements, which open doors to international collaborations that they appear to be beginning to capitalise upon, and that have led to partnerships with local industry. These include (1) development of a tool to stimulate thermal receptors beneath the skin, which has been used to evaluation thermal perception and has led to publications that include international collaborators. For example, the thermal contact stimulator was used to assess the spinothalamic system in humans without eliciting pain (2) development of an innovative automated method to assess dominance hierarchies (MALT tool) that capitalise upon displacement interactions that take place when subjects use machines designed primarily to test cognition.

Training of PhD students is a major focus within the team, which hosts a relatively very high number of postgraduate students and actively contributes to the training component provided by a major graduate school. PhD students are clearly encouraged to publish and appear as authors on the majority of the team's publications.

One of the groups successfully attracted a postdoctoral fellow with Fyssen foundation funding.

The team's remit spans disciplines, genuinely combining animal behaviour and psychology with neuroscience. While the two research axes remain separate (see below), even within groups, in places the subject matter covered is relevant across the fields.

Weaknesses and risks linked to the context

A lack of postdoctoral researchers is clearly a weakness within the pain-focussed theme. This potentially reflects a lack of international visibility: although team members have attended conferences many are at national rather than international level (with exceptions; and note that international travel was severely restricted at the end of the reporting period.).

Team 4 is cited on the Silabe website, but its contribution to Silabe is insufficiently highlighted and acknowledged. Individual researchers do not have their own webpages and are thus less likely to be asked to participate in academic events, review panels, conferences, etc. The team is not accessible to international researchers online through the LCNA website, because the website is entirely in French.

Contribution to academic life through journal editorships, grant review panels and office holding in learned societies were unbalanced during the period, and focussed on the pain theme. Only one member of the team contributed to thesis juries outside of the home institute.

Applications for external funding were limited within the pain-focussed theme, for which no records of applications for larger grants (over €400K) were provided.

The two groups within the team do not work synergistically. As the report states that the team is to be restructured, this will not be commented upon further.

It is to be expected that the team will need to become scientifically more competitive to justify this type of research, although given the success of their new recruitment round, a team is on course to achieve this.

RECOMMENDATIONS TO THE TEAM

Development of international visibility through attendance of larger international conferences, and development of an outward-looking website.

Continued focus on the use of novel tools to open new research directions, including strategic consideration of how best to increase international awareness of the MALT tool and seek out collaborators. Within the pain-focussed theme, bringing the TCS tool full circle to capitalise upon its potential to explore the relationship between pain and aging.

Specific provision of time to apply for larger grants would be beneficial toward the pain-focussed group, and if successful, would address the lack of postdoctoral staff.

CONDUCT OF THE INTERVIEWS

Date(s)

Start: 18 octobre 2022 à 14 h 30

End : 18 octobre 2022 à 17 h 30

Interview conducted online

INTERVIEW SCHEDULE

8:30-9:00	Closed door meeting with the visiting committee and the HCERES advisor
9:00-9:20	Presentation of the evaluation process to the unit by the HCERES advisor
9:20-10:00	Presentation of the unit scientific outputs and strategy by the lab director
10:00-10:20	Coffee break
10:20-12:40	Presentation of the research teams by team leaders (15' presentation + 20'discussion)
10:20-10:55	*Team 1 'Memory Dynamics & Epigenetics'*
10:55-11:30	*Team 2 'Engram'*
11:30-12:05	*Team 3" ADN'*
12 h 5 – 12 h 40	Team 4 *'Normal and Pathological Cognitive Aging'*
12:40-1 p.m.	The main lines of the unit project (future director)
1 p.m.-2 p.m.	Lunch

Lien zoom
Céline Souchay vous invite à une réunion Zoom planifiée.
https://hceres-fr.zoom.us/j/3866922336?pwd=bVJMZ3ZPcFlwemVwUHpFUC8wRk5MQT09

ID de réunion : 386 692 2336
Code secret: 572,662

2 p.m.-2:30 p.m.	Discussion with scientists (without team leaders)
2:30 p.m.-3 p.m.	Discussion with PhD students and postdocs
3 p.m.-3:30 p.m.	Discussion with engineers, technicians, and administrative personnel (in French)
3:30 p.m.-4 p.m.	*Coffee break*
4 p.m.-4:30 p.m.	Discussion with the team leaders (closed-door)
4:30 p.m.-5 p.m.	Discussion with the directors (closed-door)
5 p.m.-5:30 p.m.	Discussion with the representative of the managing bodies (closed-door)
5:30 p.m.-7 p.m.	Private meeting of the visiting committee (closed-door)
7 p.m.	End of the visit

PARTICULAR POINT TO BE MENTIONNED

GENERAL OBSERVATIONS OF THE SUPERVISORS

Université de Strasbourg

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

Strasbourg, le 8 juin 2023

Objet : Rapport d'évaluation DER-PUR230023276 - LNCA - Laboratoire de neurosciences cognitives et adaptatives

Réf. : RB/FF/ 2023-436

Rémi Barillon
Vice-Président Recherche, Formation doctorale et Science ouverte

Cher Collègue,

L'université de Strasbourg vous remercie ainsi que tous les membres du comité HCERES pour le travail d'expertise réalisé sur l'unité de recherche « Laboratoire de neurosciences cognitives et adaptatives » (LNCA – UMR 7364).

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

La tutelle CNRS nous a indiqué qu'elle ne s'exprimerait pas sur le rapport d'évaluation à ce stade.

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

Rémi Barillon

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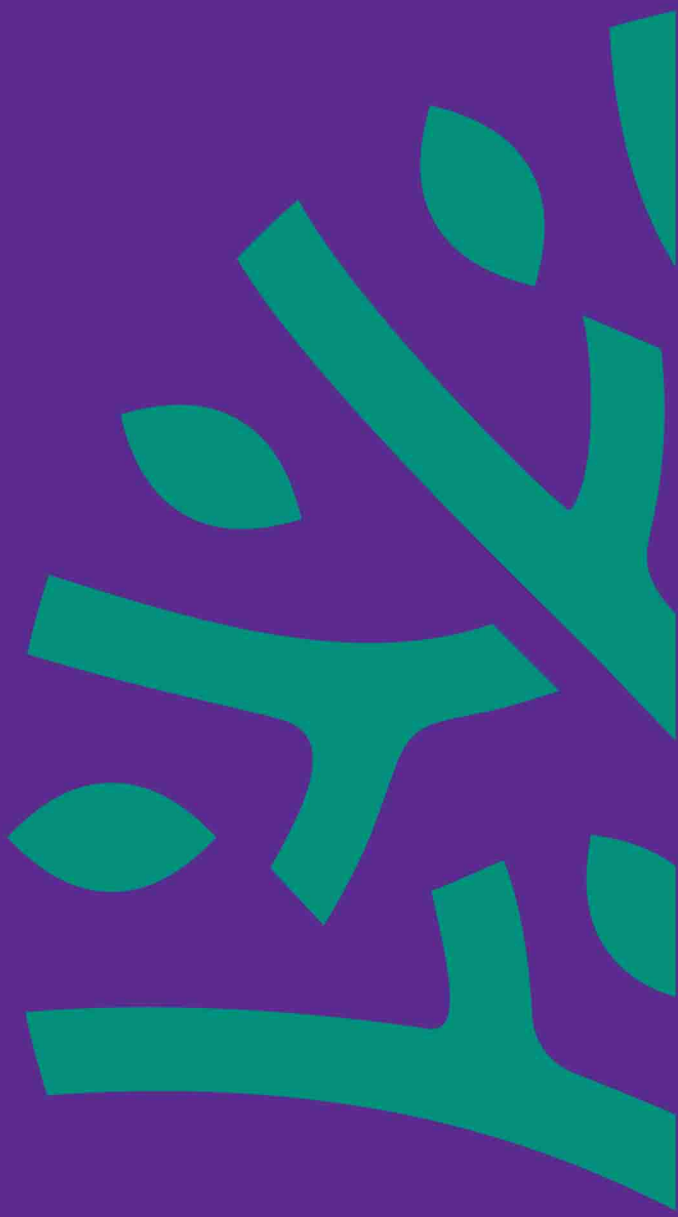

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