Research evaluation

EVALUATION REPORT ON THE RESEARCH UNIT:

Institute of Human Genetics (IGH)

UNDER THE SUPERVISION OF THE FOLLOWING INSTITUTIONS AND RESEARCH BODIES:

Université de Montpellier

Centre National de la Recherche Scientifique - CNRS

EVALUATION CAMPAIGN 2019-2020
GROUP A

In the name of Hcéres[1]:

Nelly Dupin, acting President

In the name of the experts committee[2]:

Geneviève Almouzni, Chairwoman of the committee

Under the decree No.2014-1365 dated 14 November 2014,

[1] The president of Hcéres "countersigns the evaluation reports set up by the experts committees and signed by their chairman." (Article 8, paragraph 5);

[2] The evaluation reports "are signed by the chairman of the experts committee". (Article 11, paragraph 2).

This report is the sole result of the unit's evaluation by the expert committee, the composition of which is specified below. The assessments contained herein are the expression of an independent and collegial reviewing by the committee.
Tables in this report were filled with data submitted by the supervising body on behalf the unit.

UNIT PRESENTATION

Unit name:	Institute of Human Genetics
Unit acronym:	IGH
Current label and N°:	UMR 9002
ID RNSR:	201722404H
Application type:	Renewal
Head of the unit (2019-2020):	Mr Monsef Benkirane
Project leader (2021-2025):	Mr Philippe Pasero
Number of teams and/or themes:	23

EXPERTS COMMITEE MEMBERS

Chair:	Ms Geneviève Almouzni, Institut Curie, Paris
Experts:	Mr Peter B. Becker, Federal State of Bavaria, Planegg, Germany Ms Florence Besse (Épouse Aubry), CNRS, Nice Mr Marc Blondel, Université Bretagne Loire, Brest Mr Simon Boulton, The Francis Crick Institute, London, United-Kingdom Ms Déborah Bourc'his, Institut Curie, Paris (representative of CNRS) Mr Fabrizio D'adda Di Fagagna, IFOM, The FIRC Institute of Molecular Oncology, Milan, Italy Ms Cathie Erb, Inserm, Illkirch (supporting personnel) Ms Anne Hosmalin, CNRS, Paris Mr Helder Maiato, Institute for Research and Innovation in Health, Porto, Portugal Mr Jean-Christophe Marine, VIB-KU Leuven Center for Cancer Biology, Belgium Mr Ramesh Pillai, University of Geneva, Geneva, Switzerland Mr Jan Rehwinkel, University of Oxford, Oxford, United-Kingdom Ms Fatima Sanchez-Cabo, CNIC, Madrid, Spain Mr Mikhail Spivakov, MRC London Institute of Medical Sciences, London, United-Kingdom

HCÉRES REPRESENTATIVE

Mr Hinrich Gronemeyer

REPRESENTATIVES OF SUPERVISING BODIES

Due to the Coronavirus epidemic, the site visit has been cancelled and the committee, following the instructions from the HCERES and in agreement with the unit director, conducted the evaluation of the unit under these exceptional circumstances based on the documentation no site visit and the various updates provided by the unit. There has been no request of the supervising bodies for a specific interaction with the committee.

INTRODUCTION

HISTORY AND GEOGRAPHICAL LOCATION OF THE UNIT

The Institute of Human Genetics (Institut de Génétique Humaine, IGH) was founded in 1998 by Professor Jacques Demaille, former director of the CRBM institute of Montpellier. The IGH was originally a CNRS unit and became associated with the University of Montpellier in 2017. IGH is located within the fast-growing biomedical campus Arnaud de Villeneuve in Montpellier, which includes several CNRS and Inserm laboratories (Centre de Biochimie Structurale (CBS), Institut de Génomique Fonctionnelle (IGF), Laboratoire de Physiologie et Médecine Expérimentale (PHYMEDEXP), academic hospitals and the new University of Montpellier School of Medicine (Montpellier University) that opened in 2017. It is close to the site of the University of Montpellier and the Center for Cancer Research (IRCM). The Institute has a total surface area of 3800 m2 and has around 220 active personnel. Two teams are relocated, one (IMGT) to the Faculty of Pharmacy and the other (part of the "Maintenance of genome integrity during DNA replication" team which focuses on multiple myeloma) to St Eloi Hospital.

A project for a business building is also underway, pending funding from the Occitanie region.

Management team

The Institute Director Monsef Benkirane is assisted by a Deputy Director, Dominique Giorgi. The future director proposed is Philippe Pasero.

HCÉRES NOMENCLATURE

SVE2 - Cell Biology, Imaging, Molecular Biology, Biochemistry, Genomics, Systemic Biology

SVE3 - Microbiology, Virology, Immunology

THEMATICS

There are three major thematics covered in scientific departments: (i) Genome Dynamics, (ii) Genetics and Development, (iii) Molecular Bases of Human Diseases. The unit has developed a set of technologies that are constantly updated to ensure the availability of the most appropriate tools for the questions of interest and their model systems.

UNIT WORKFORCE

Institute of Human Genetics		
Active staff	**Number 06/30/2019**	**Number 01/01/2021**
Full professors and similar positions	4	4
Assistant professors and similar positions	7	7
Full time research directors (Directeurs de recherche) and similar positions	23	23
Full time research associates (Chargés de recherche) and similar positions	27	27
Other scientists ("Conservateurs, cadres scientifiques des EPIC, fondations, industries, etc.")	0	0
High school teachers	0	0

Supporting personnel (ITAs, BIATSSs and others, notably of EPICs)	42	40
Permanent staff	**103**	**101**
Non-permanent professors and associate professors, including emeritus	2	
Non-permanent full time scientists, including emeritus, post-docs (except PhD students)	37	
PhD Students	29	
Non-permanent supporting personnel	58	
Non-permanent staff	**58**	
Total	**229**	**101**

GLOBAL ASSESSMENT OF THE UNIT

Since its inception in 1998, the development of IGH has enabled to promote a research of high standard, with a success that is confirmed over time. This is due to an effective combination of active teams successful in securing funding, along with the developments of technological regional platforms (Biocampus) providing high level quality technological services (deep sequencing, microscopy, etc.) and the particular context of the Laboratory of Excellence (LabEx) EpiGenMed initiated at IGH. The latter enabled not only to bring together excellent teams in Montpellier life sciences which engaged in collaborative works towards new frontiers in Sciences, unexplored fields of research and develop new paradigms, but also to set up international PhD and postdoc programs that could fuel their laboratories with talented people and preparing new generation of scientists. The capacity to build on this instrument to attract teams of excellence by offering a generous package after a highly competitive selection by an ad hoc committee also proved very efficient. The scientific output is remarkable with major contributions in understanding the organization, dynamics and expression of the genome at the molecular, cellular and whole organism levels, and further engaging into elucidating the mechanisms leading to pathologies associated with disruption of these biological processes with implications in translational and possibly even clinical work.

Within the period from 2014 to April 2019 IGH had 175 publications which were considered by the panel as major contributions to the field. This scientific excellence is also supported by their success to the highly prestigious ERC grant applications.

The current Director of IGH and the current deputy director with the general administrator should be praised for their great leadership and engagement for the future with the establishment of shared services (Project Office, TTO) and projects of expansion for the construction of two buildings, respectively IncubaSciences and a building devoted to an Artifical intelligence and Cancer department, a timely and important area to develop for which the Bettencourt Schueller foundation has been solicited. They also managed to create an international laboratory with Oxford. Thus, the future director is now well placed to pursue and further develop the capacities of IGH with the trust of the group leaders and the personnel.

The IGH has thus at hands the key ingredients to produce outstanding research and continues to be a central piece in the international arena. They should be encouraged to pursue and strive for the best science in an attractive working place.

DETAILED ASSESSEMENT OF THE UNIT

According to the instructions from the HCERES, the reporting has been stopped at the level of the Pre-Report. The unit has subsequently provided updates in particular about accepted publications and grants. Several issues noted in Pre-Report could not be followed up as it would have been the case in a discussion with the DUs and PIs at a site visit. Similarly, to properly evaluate the life of the IGH the exchange with the personal ITAs, PhDS, postdocs was missing, thus the panel decided not to rank this criterion.

Thus, the present report can be considered as preliminary statements of the committee, solely based on documents and not on a true scientific discussion with the possibility to examine the actual resource on site. It can not be excluded that some issues would have been modified after a site visit.

Importantly, this concerns also the scores, which have been attributed on the basis of the available documentation. The committee has done its best to try and score the teams according to the same criteria but this could not be done with the same rigor, as during a site visit where all experts together could listen to the presentations of all PIs and the DUs and contribute to the scientific discussions to try and reach a consensus and harmonize the overall rating in an in-depth discussion.

UNIT'S RESPONSE TO PREVIOUS RECOMMENDATIONS

The unit has responded to the recommendations of the previous visiting committee in several ways.

In particular, they invested in bioinformatics by creating collaborations with computational teams within the IGH (Ritchie's team joined IGH as a junior group in 2015) and by assisting the IGH teams in interviewing, hiring bioinformaticians and mentoring as needed.

Importantly, IGH is currently creating a new department dedicated to Artificial Intelligence in genomic and cancer, an action that should be encouraged as it should also help them to branch out and interact further with the local Universities and hospitals, an opportunity that still needs to be further exploited. This is what they call the ALIGN initiative (as part of a Federation de Recherche) with the Laboratoire d'Informatique, de Robotique et de Micro-électronique de Montpellier (LIRMM), the CBS and the Maths department of the Montpellier University. This will also go beyond the local initiative towards interactions at an international level, and they have already set out to be labelled as a Laboratoire International Associé with Oxford. They gained support from the INSB, INSMI and INS2I from the CNRS and the University of Montpellier. This project is very promising.

They have defined a Junior PI policy for recruitment and career development that is very constructive and at the highest standards. They are still waiting for support from the Bettencourt Foundation for feedback on funding.

CRITERION 1: QUALITY OF SCIENTIFIC OUTPUTS AND ACTIVITIES

A – Scientific outputs and activities, academic collaborations, reputation and appeal

From 01/01/2014 to 06/30/2019	IGH
Articles	
Scientific articles (total number)	295
Scientific articles with first and/or last authorship *(Biology only)*	197
Review articles (total number)	84
Other articles (professional journals, etc.) (total number)	3
Clinical articles *(Biology only)*	6
Books	
Monographs, critical editions, translations (total number)	1

Management and coordination of scientific books / Scientific book edition	0
Management and coordination of scientific books / Scientific book edition in English or another foreign language	3
Book chapters (total number)	11
Book chapters in English or another foreign language	9
Edited theses	1
Production in conferences / congresses and research seminars	
Meeting abstracts	338
Articles published in conference proceedings / congress	33
Other products presented in symposia / congress and research seminars	43
Electronic tools and products	
Softwares	21
Databases	8
Tools for decision making	0
Cohorts *(Biology only)*	1
Instruments and methodology	
Prototypes	6
Platforms and observatories	0
Other products	
Theorised artistic creations, staging, movies	2
Editorial activities	
Participation in editorial committees (books, collections, etc.)	27
Collection and series management	3
Reviewing activities	
Reviewing of articles	489
Grant evaluation (public or charities)	255
Reviewing of research institutes	25
Participation in institutional committees and juries (CNRS, Inserm, etc.)	119
Academic research grants	
European (ERC, H2020, etc.) and international (NSF, JSPS, NIH, World Bank, FAO, etc.) grants coordination	14
European (ERC, H2020, etc.) and international (NSF, JSPS, NIH, World Bank, FAO, etc.) grants – partnership	4
Other European grants - coordination	10
Other European grants - partnership	7
National public grants (ANR, PHRC, FUI, INCA, etc.) - coordination	39

National public grants (ANR, PHRC, FUI, INCA, etc.) - partnership	16
Local grants (collectivités territoriales) - coordination	15
Local grants (collectivités territoriales) - partnership	2
PIA (labex, equipex etc.) grants - coordination	12
PIA (labex, equipex etc.) grants - partnership	3
Grants from foundations and charities (ARC, FMR, FRM, etc.) - coordination	59
Grants from foundations and charities (ARC, FMR, FRM, etc.) - partnership	4
Visiting senior scientists and post-docs	
Post-docs (total number)	95
Foreign post-docs	54
Visiting scientists (total number)	16
Foreign visiting scientists	11
Scientific recognition	
Prizes and/or distinctions	43
IUF members	2
Chair of learned and scientific societies	12
Organisations of meetings and symposia (out of France)	39
Invitations to meetings and symposia (out of France)	338
Members' long-term visits abroad	38

Strengths

The committee concluded that the IGH is a world leading center for Genome Dynamics, Genetics and Development and Molecular Bases of Human Diseases. They could compare with other highly regarded Departments and Institutes including, for example, EMBL, the Gurdon Institute and the MRC Human Genetics Unit in Edinburgh.

The committee considered the scientific output as generally outstanding, this is attested by the numbers indicated in the report of high-quality peer reviewed papers generated from many teams, including publications in the leading journals as well as the more specialized journals held in equal esteem by the community.

Research in the Unit is also very strongly supported by core facilities, with excellent platforms for imaging in particular and the access to BioCampus Montpellier a top-notch technological environment. The committee also noted very exciting collaborations between different groups as shown by joint publications.

Several of the senior group leaders have also featured prominently at high profile International conferences, as well as participating in the organization of a number of meetings and conferences and societies. This involvement ensures that the IGH maintains a high level of visibility in the Genome dynamics, genetics and developmental bases of disease community. They attracted new teams of key importance for their strategic vision, in particular that entitled "Machine Learning and Gene regulation" which will be central for the establishment of their new department: Artificial Intelligence in Genomics and Cancer. With the recent creation of the international research Laboratory (LRI) with the University of Oxford the IGH will also be able to boost further its international dimension.

The productivity of the groups is reflected in the high success rates in obtaining external grant support. Of particular note is that a high proportion of teams have been successful in obtaining very prestigious ERC grant awards. The group leaders should be commended on maintaining a strong record of external grant funding.

It is our regret that due to the lack of a site visit (due to the COVID19 situation) the committee could not hear the research presentations from all the team leaders to fully appreciate the breadth and forward-looking aspects of the ongoing science. However, the committee was informed by written updates that further groups had been successful at obtaining additional grant support.

In conclusion, the committee considered that the model for governance with a new director appointed each term and excellent administrative and support services was a very strong asset. Similar major assets are the ability to ensure access to state-of-the-art platforms (Thanks to Biocampus), the recent creation of the PCV office (projects, communication and valorization), the international orientation of the institute, with PIs involved in organizing international meetings, as well as sufficient funding due to good success rates in national and European grant applications, the strong support from CNRS and the LabEx with the University of Montpellier.

Weaknesses

There is a general need to attract international postdocs (although some groups do manage very well on this front) and this aspect will deserve extra attention possibly by exploiting further the international network of the IGH members and their alumni and also by creating attractive packages for career development for postdocs. There is also a certain degree of heterogeneity in performance of the teams, several with an outstanding stature while some not top-rated. The latter may need some attention. The bioinformatics remains an area that deserve attention for the future, even if they have started with the recruitment of a computational team, more is needed. The future AI department is a potential avenue; this should help to increase their collaborations with clinicians and industry. Several teams still lack a permanent technical support, this is sometimes at odd with the productivity of these teams. The LabEx funding ensures core funding, which will hopefully enable some flexible funding/seed new projects and areas of research. It will be important for them that the I-SITE MUSE and the LabEx EpigeneMed can be renewed.

Assessment of scientific outputs, reputation and appeal of the unit

Overall, the scientific output, reputation and appeal of the unit is excellent to outstanding. Some heterogeneity has been noted by the committee with a small number of teams that perform less well.

B – Interactions with the non-academic world, impacts on economy, society, culture or health

From 01/01/2014 to 06/30/2019	
Socio-economic interactions / patents	
Invention disclosures	15
Filed patents	12
Accepted patents	26
Licenced patents	1
Socio-economic interactions	
Industrial and R&D contracts	41
Cifre fellowships	1
Creation of labs with private-public partnerships	0
Networks and mixed units	0
Start-up	2
Clinical trials *(Biology only)*	1
Expertise	
Consulting	21

Participation in expert committees (ANSES etc.)	4
Legal expertise	1
Expert and standardization reports	0
Public outreach	
Radio broadcasts, TV shows, magazines and newspapers	51
Journal articles, interviews, book edition, videos, other popularization outputs, debates on science and society, etc.	26

Strengths

Overall this area has been strengthened with Genopolys. The unique setting at Genopolys enabled them to organize series of events for science and society, scientific workshops and events for primary and senior high school students. They have thus been able to increase the capability for public outreach.

In addition, they have also developed a plan for interactions with private companies in their Incubascience project, a 3000 m^2 center dedicated to the development of companies in Life Sciences sectors, to promote entrepreneurship among their PhDs and postdocs, and to host researchers from national and international companies. They created MT-act a company developing therapeutics for glaucoma, Diag2Tec has been laureate of the i-lab innovation prize in 2016, devoted to hematological cancers for biomarker discovery and companion diagnostic tests. They also organized a series of workshops involving private sector (ex: EuroBioMed of AI in medical diagnostics – Symposium held at Genopolys 2018), and Occitanie Innovation Workshop in 2019). The unit filed 35 patents (2014-2020). They managed to ensure fundraising with the foundation MSD Avenir along three major schemes: GNOSTIC to study the mechanisms and consequences of higher-order protein assemblies (involving 6 IGH teams), Hide-Inflame-and-Seq for understanding HIV persistence and inflammation (4 teams involved) and GENEIGH to study the genetic and epigenetic control of genome stability (involving 3 teams).

Weaknesses

The committee has not detected any significant weaknesses.

Assessment of the interactions of the unit with the non-academic world

The unit has excellent to outstanding interactions with the non-academic world.

C – Involvement in training through research

From 01/01/2014 to 06/30/2019	
Educational outputs	
Books	0
E-learning, MOOCs, multimedia courses, etc.	8
Scientific productions (articles, books, etc.) from theses	
Scientific productions (articles, books, etc.) from theses	55

Mean number of publications per student *(Biology & Science and technology only)*	
Training	
Habilitated (HDR) scientists	37
HDR obtained during the period	9
PhD students (total number)	63,5
PhD students benefiting from a specific doctoral contract	48,5
Defended PhDs	38
Mean PhD duration	
Internships (M1, M2)	168
People in charge for a mention or a master's degree course (total number)	26
People in charge for a mention or a master's degree course with international certification (Erasmus mundus)	4

Strengths

As a research institute, the performance here is mainly on advanced training of Master and PhD students. However, they also have in their personnel people involved in teaching at the university which creates a great link with their lab and facilitate the identification of students to join in internships. Their international courses, and participation to ITN (European network for training) is also a great asset. They founded the MSc Genetics, Epigenetics and Cell fate Biology.

Weaknesses

The number of researchers with position at the University still remains limited and could be increased and efforts to attract talented PhD students should be further developed, they need to secure extra funding for this. The committee was worried that some PhD students defended without (1st author) publication.

Assessment of the involvement in training through research

Several teams are outstanding in their training efforts. Overall, the unit is very good in training young researchers.

CRITERION 2: UNIT ORGANISATION AND LIFE

From 01/01/2014 to 06/30/2019	
Management, activity and organisation in the unit	
Is there a policy validated by one or more tutelage?	Oui
Number of meetings of the council overseeing the unit's function? *(from 01/01/2014 to 06/30/2019)*	8
Number of internal seminars to the unit and team? *(from 01/01/2014 to 06/30/2019)*	122
Number of specific meetings between the research staff and the Board (unit and team)? *(from 01/01/2014 to 06/30/2019)*	8

Is there a convivial place where the unit and each team can get together?	Oui
Is there a job description for each staff member (technicians, engineers, admins.) in the unit?	Oui
Is there a support plan for the unit's call for projects?	Oui
Are there other means of communication (newsletters, etc.)?	Oui
Does the unit grant money for publications?	Oui
Does the unit grant money for international publications? (translation, copy-editing, etc.)	Oui
Is there an incentive policy "Open Sciences" type? (HAL)	Oui
Parity	
Number of women in the unit	131
Number of men in the unit	117
Number of women among university lecturer-researchers and research workers in the unit	21
Number of men among university lecturer-researchers and research workers in the unit	38
Number of women within the Board (steering-committee, subdirectorate in the unit, team manager, etc.)	8
Number of men within the Board (steering-committee, subdirectorate in the unit, team manager, etc.)	15
Scientific integrity	
Does the unit offer lab-notebooks for the staff?	oui
Does the unit have a policy regarding scientific integrity?	oui
Health and safety	
Does the unit have a training policy regarding health and safety?	oui
Does the unit have an awareness policy regarding psycho-social factors?	non
Is there a health and safety record?	oui
Is there a record updated each year?	oui
Number of safety assistants?	oui
Sustainable development and environmental impacts	
Is there a chart regarding sustainable development or a section dedicated to its stacks in the internal rules?	Non
Intellectual property and business intelligence	
Is the unit ranked ZRR? (area of restrictive regime)	Non
Does the unit have a policy regarding data protection?	Oui
Is there an internal or external point of contact in charge of information-system safety?	Oui
Is there an SSI policy? (Information system safety)	Oui

Strengths

Based on the written documents, the overall organization and life of the unit does fulfill all criteria to provide a strong working environment, the stimulating and collaborative spirit is a major strength. Indeed, the IGH has set up most of the good management tools to offer very good working conditions for a unit of about 200 people as shown in their charts describing their governance. This includes regular council meetings, procedures and formal job descriptions

and career development for Junior Group leader, seminar programs, mini-symposia and retreats, as well as specific ITAs day and postdocs and PhD day with events for Young scientists. They have set up advanced training programs with two professors actively engaged and they also promoted links with the economic world through meetings but also by developing awareness in innovation and intellectual properties with a recently established Tech Transfer Office.

Their grant office is also a major asset to support the JPI in their grant application.

The 78 people working at IGH as support staff - 39 % of the workforce of the IGH - are highly involved in the research activities and collective tasks of the daily organization, including training for the various equipments and their servicing. The technical staff appreciate the support that the IGH provides for their career development, although they regret that successful promotion remains limited and would like to have more opportunities for training from the CNRS.

A significant number of technicians belong to common services and thus several teams without permanent technical support. Furthermore, several retirements are anticipated in the coming years. Indeed, the ITA/Researcher ratio is 0.7 (on permanent contract), this is relatively low, and the effort made to pay the additional 36 fixed term contracts helps to bring the ratio to 1,3. This effort should be praised, yet governing bodies should be aware of the fact that the balance between permanent and short-term contracts for the ITAs deserves attention to ensure a long-term memory in each team and sustain the strong technological platforms at IGH. From 2014 to 2019, the balance of hiring (recruitments or transfers) and departures of CNRS permanent ITAs is positive (+3), indicating commitment of the CNRS to ensure the performance of new teams and new common services.

A more detailed evaluation of the unit organization and life will require a site visit. It is indeed difficult to assess without site visit the access to platforms and services, the function of the Tech Transfer Office or the mentoring of YPIs.

All of these require exchange with people locally, to be able to see the set-up.

Weaknesses

Space constraints remain an issue, access to office for some teams but the hope is that this should be sorted out with the extra space to come. Nevertheless, a clear definition of their policy for space allocation could help them to handle the issue in general terms, this should be written and validated by their SAB for example, an expert group of people that can also provide them with examples and benchmark. The committee noticed an unbalanced gender ratio especially for team leaders and research directors. The governance is aware of the situation and has to launch efforts to improve the gender balance at the PI level, in particular for the future recruitments. Internal communication and information transfer to all staff members (to reach all categories of personnel from PI, to postdocs, PhDs and support or technical staff) are always matters that can be stimulated, for example establishing a regular Newsletter could help to inform all IGH members of the upcoming events and important evolution in their organization. Defining a chart regarding sustainable development or a section dedicated to its stakes in the internal rules would be important especially in light of the new buildings to ensure that their set up can compile with new regulations.

Written report from the IGH SAB would have been useful to have a better view from an external group of experts that is familiar with the working place, and could have provided specific suggestions on this front, their role in the recruitment and strategic decisions could also be better defined.

Assessment of the unit's life and organisation

The committee wishes to emphasize that it is particularly difficult to assess the Unit Organization and Life without having the possibility to discuss directly with the direction, PIs, postdocs, PhD students and ITAs during a typical site visit. Therefore, the committee decided not to provide a score for this criterium.

CRITERION 3: FIVE-YEAR PROJECT AND STRATEGY

	Objectives	**Expected results** (figures when possible)
Criterion 1: RESEARCH PRODUCTS AND ACTIVITIES		
Scientific outputs and activities, academic reputation and appeal		
Articles Books Production in conferences / congresses and research seminars Electronic tools and products Instruments and methodology Other products Editorial activities Reviewing activities Academic research grants Visiting senior scientists and post-docs Scientific recognition	Publications: augmenter encore la proportion d'articles de l'IGH publiés dans les journaux à très forte visibilité. Organisation de colloques internationaux: maintenir ou augmenter la visibilité internationale de l'IGH via l'organisation de colloques. Contrats de recherche: augmenter le nombre d'équipes de l'IGH recevant des financements européens. Accueil de postdoctorants: augmenter l'attractivité de l'IGH pour les meilleurs postdoctorants étrangers.	Atteindre 30% d'articles dans le Top10% (WoS), organiser au moins deux colloques internationaux pae an, atteindre 30% des équipes financées par des contrats européens.
Interactions with the non-academic world, impacts on economy, society, culture or health		
Socio-economic interactions / patents Socio-economic interactions Expertise Public outreach	S'appuyer sur le bureau PCV pour augmenter le nombre de brevets déposés par les équipes de l'IGH, maintenir le haut niveau d'implication des équipes de l'IGH dans l'évaluation scientifique, impliquer plus de chercheurs de l'IGH dans l'activité de Génopolys.	Organisation de cours pratiques ou d'écoles thématiques à Génopolys.
Involvement in training through research		
Educational outputs Scientific productions (articles, books, etc.) from theses Training	Augmenter l'attractivité de l'IGH pour les étudiants en thèse, maintenir un haut niveau d'implication des chercheurs de l'IGH dans l'enseignement au niveau M1 et M2.	Maintenir et développer les journées portes ouvertes pour les étudiants de Master.
Criterion 2: ORGANISATION AND LIFE OF THE UNIT		

Management, activity and organisation in the unit Parity Scientific integrity Health and safety Sustainable development and environmental impacts Intellectual property and business intelligence	Améliorer la parité femme-homme à l'IGH, maintenir un haut niveau d'intégrité scientifique, de procédures d'hygiène-sécurité et de sécurité informatique à l'IGH.	Mise en place d'un serveur d'archivage des données brutes associées à chaque article publié par l'IGH.

Strengths

The strategic plan will build on the strong foundations of the unit and the excellent existing teams, in particular building on their New PCV service will be an asset to sustain funding and develop interactions with the industry. It will be important to ensure a good fit of all teams in the general strategic direction of the institute. For example, thought should be devoted to how team 19 can benefit from the IGH environment for its program on the 'Tubulin code'.

The new AI and Cancer department as well as the International laboratory with Oxford can also be major tools to increase the flow of PhD or postdocs and the scientific exchange. Finally, the key items listed in the organization and life of the unit try and address points that they have identified as critical.

Weaknesses

The unit still depends to a significant extent on the success of setting up the new department of AI and Cancer. Ensuring that it can be soon operational will be a challenge and transitioning with the building and space should also be looked at carefully, along with the critical recruitments of postdocs and PhDs and technical support where it is still missing.

Assessment of the unit's scientific strategy and projects

While some indications could be provided based on written documents, the committee strongly emphasizes the limitation of an evaluation without being able to discuss with the key people in the institute (as well as the representatives of the tutelles). Based on the information that is available to the committee, the strategy and projects of the unit as a whole are considered outstanding.

RECOMMENDATIONS TO THE UNIT

A – Recommendations on scientific production and activities (criterion 1)

The recommendations concerning scientific production and activities are to sustain their momentum and continue their quest for excellence. Their achievement has been impressive so far and the high caliber science produced should be praised. The retirement of two senior groups (teams 9 and 23) who contributed significantly to these outputs should be looked into carefully in order to ensure that through turn-over and recruitment the same level of scientific activities can be ensured in the future.

The recruitment of a senior PI (team 22) is an opportunity to strengthen areas related to imaging and RNA biology. The two new group leaders are also promising and IGH should continue their recruitment approach to ensure a good renewal turn-over in the IGH considering/anticipating the future retirement plans.

B – Recommendations on the unit's organisation and life (criterion 2)

The unit Organization and Life shows indicators of a healthy collaborative environment with all aspects concerning each category of personnel that have been taken into account. The JPI procedures for recruitment and career development should be actively sustained. The possibilities of expansion in terms of space should also be opportunities to increase the well-being in the unit. Careful attention to ensure that each PI can benefit of a

technical support would be important as well as the possibility for more promotion of the technical and support staff. Training activities have ramped up with the professors in place and should continue to develop.

The Institute and the team headed by a Hospital Biologist should make better use of the opportunity to do translational research together.

Of note, two teams will not be in the new contract, yet they have been remarkable assets for the IGH. Ensuring for them to finalize their term to get full fruition in their investment is needed and thoughts should be given to ensure their replacement.

C – Recommendations on scientific strategy and projects (criterion 3)

The aims are to pursue research in the areas of Genome Dynamics, Genetics and Development and Molecular Bases of Human Diseases as a world leading center. It will be important to ensure that cohesion and coherence of the projects of the individual teams do contribute to these overarching goals. The new recruitments to replace the past members in time will need a careful follow up.

The scientific strategy with a strong investment in AI seems timely to promote these themes, and is encouraged by the panel. The investment in AI with the ALIGN department, and its integration in a Federation de Recherche with the Laboratory of Informatics, Robotics and Microelectronics of Montpellier (LIRMM), the CBS and the Institute of Mathematics at the University Montpellier (IMAG) will be a major effort that requires clear visions. ALIGN has the potential to develop into a beacon, but the selection of teams, spirit of collaboration, as well as strong and efficient management structures will be critical for success.

The development of the Incubasciences project to promote academic power in the biology and health with the 3000 m^2 innovation center dedicated to the development of Companies in the Life Sciences in relation to their flagship themes is an important ambition and the committee encourages the IGH to pursue this plan.

The International Joint Research laboratory with teams of the university Oxford is a great avenue to explore to develop their international stature and possibly exchange program with PhDs and postdocs to feed their laboratories with talents and leverage funding. However, the plans should be specified and a clear scope has to be formulated. It will be essential based on a precise scope with the suitable operation modalities to set a strategic development beyond simple occasional collaboration between teams. The panel would like to point out the many issues that have to be addressed, including IP issues, to make this a real success in the context of a change in the political relationship between the EU and Britain. Thus, while attractive as an idea, the reality may be much more cumbersome than originally anticipated.

Francis Poulat will follow Brigitte Boizet as team leader (team "Development and Pathology of the gonad"), further thoughts and measures should be considered to ensure that this transition is accompanied for the success of the team.

RESPONSES TO SPECIFIC QUERIES OF SUPERVISING BODIES (If any)

As per the request of the CNRS the evaluation provided is strictly based on scientific criteria.

The feasibility, originality and quality of each projects in each team have been examined based on written documents in details by at least two experts and the overall relevance integration in the context of the whole laboratoty considered at the best (although the committee did not have the opportunity to carry out a site visit to fully appreciate this dimension). The IGH and the local environment surely provides a strong ground for the proposed projects and the wish to develop the AI is of utmost interest for many projects. The proposed research programs falling into the three major thematics covered in scientific departments: (i) Genome Dynamics (Bernard deMassy), (ii) Genetics and Development (Jean-Maurice Dura), (iii) Molecular Bases of Human Diseases (Angelos Constantinou) are perfectly in line the CNRS missions to carry out frontier research. Furthermore, the unit has made efforts to develop the set of technologies and constantly updated them to ensure the availability of the most appropriate tools for the questions of interest and their model systems. Overall, the projects proposed have been considered as feasible and when necessary advice to consider alternative plans were made by the experts.

The overall quality of the scientific project for the whole laboratory has been appreciated based on the documents provided. As stated above, while some indications could be provided based on written documents, the committee strongly emphasizes the limitation of an evaluation without being able to discuss with the key people in the institute (as well as with the representatives of the tutelles). Nevertheless, based on the information that is available to the committee, the strategy and projects of the unit as a whole are considered outstanding. The IGH does represent in France a stimulating scientific environment with a flux of ideas and people, orchestrated with a strong energy under the impulse of the unit director and his team for the past period as attested by the productivity and attractiveness of the place. Similarly, the future program offers positive promises under the strategic guidance of the new director with his team.

Concerning the interactions of the IGH with local research structures – Campus, the common platforms do represent a forum for interactions that is highly important. Efforts towards integration of medical partners are ongoing and can be further expanded. The plans with the AI and Cancer department can represent another strong opportunity to further develop the interactions locally. The multidisciplinarity is truly a general motto that the IGH is embracing and has engaged in many ways to develop and expand their resources to leverage this potential. Support from the CNRS to encourage these dynamics will be important.

As recommended, young teams (created less than 4 year ago) have not been evaluated.

For the creation of teams, the justification based on evaluation of the quality of the project and the adequation of the resources was asked as part of the recruitment procedures of the IGH with the role of their international Scientific Advisory Board in each case to ensure to assess the competitivity of the projects at an international level. The details are in the report.

CONDUCT OF THE VISIT

DATES

Start: 9 March 2020 at 8:00

End: 11 March 2020 at 18:00

VISIT SITE

Institution: CNRS

Address: 141 Rue de la Cardonille, 34396 MONTPELLIER CEDEX 5

CONDUCT OR PROGRAM OF THE VISIT

Due to the SARS-Cov2 pandemic the site visit has been suspended.

SPECIFIC POINTS

According to the instructions from the HCERES, the reporting has been stopped at the level of the Pre-Report. The unit has subsequently provided updates in particular about accepted publications and grants. Several issues noted in Pre-Report could not be followed up as it would have been the case in a discussion with the DUs and PIs at a site visit. Similarly, to properly evaluate the life of the IGH the exchange with the personal ITAs, PhDS, postdocs was missing, thus the panel decided not to rank this criterion.

Thus, the present report can be considered as preliminary statements of the committee, solely based on documents and not on a true scientific discussion with the possibility to examine the actual resource on site. It can not be excluded that some issues would have been modified after a site visit.

Importantly, this concerns also the scores, which have been attributed on the basis of the available documentation. The committee has done its best to try and score the teams according to the same criteria but this could not be done with the same rigor, as during a site visit where all experts together could listen to the presentations of all PIs and the DUs and contribute to the scientific discussions to try and reach a consensus and harmonize the overall rating in an in-depth discussion.

TEAM 20

Systemic impact of small regulatory RNAs

TEAM 20 LEADER

Mr Hervé Seitz

TEAM 20 SCIENTIFIC DOMAIN

The central goal of the team is to understand how microRNAs identify their target mRNAs, using various model systems (mammalian cells, *Nematostella*, *Drosophila*), and combining high-throughput genomic appproaches with bioinformatics. They are interested in a number of topics that revolve around this main theme: 1) Identify the different modes of interaction between miRNAs and targets in different organisms, 2) defining what is the level of false-positives in widely used prediction programs, 3) define a set of targets that can explain the phenotypic consequence of not having a particular microRNA in fly and mammalian systems, 4) identify additional targets of miRNAs that can in turn regulate the levels of the small RNAs.

TEAM'S 20 RESPONSE TO PREVIOUS RECOMMENDATIONS

The team has very efficiently followed the previous recommendation to quickly establish solid ground by publishing. Indeed, they published three very good publications as corresponding author studies: *Genome Res*, 2014; *Genome Res*, 2017; *PLoS Gen*, 2019; and *Nature Structural Molecular Biology*, 2017.

TEAM 20 WORKFORCE

T20: Systemic impact of small regulatory RNAs		
Active staff	**Number 06/30/2019**	**Number 01/01/2021**
Full professors and similar positions	0	0
Assistant professors and similar positions	0	0
Full time research directors (Directeurs de recherche) and similar positions	1	1
Full time research associates (Chargés de recherche) and similar positions	1	1
Other scientists ("Conservateurs, cadres scientifiques des EPIC, fondations, industries, etc.")	0	0
High school teachers	0	0
Supporting personnel (ITAs, BIATSSs and others, notably of EPICs)	0	0
Permanent staff	**2**	**2**
Non-permanent professors and associate professors, including emeritus	0	
Non-permanent full time scientists, including emeritus, post-docs (except PhD students)	0	
PhD Students	1	
Non-permanent supporting personnel	0	

Non permanent staff	**1**	
Total	**3**	**2**

CRITERION 1: QUALITY OF SCIENTIFIC OUTPUTS AND ACTIVITIES OF TEAM 20

A - Scientific outputs and activities, academic collaborations, reputation and appeal

From 01/01/2014 to 06/30/2019	Team 20
Articles	
Scientific articles (total number)	9
Scientific articles with first and/or last authorship *(Biology only)*	3
Review articles (total number)	5
Other articles (professional journals, etc.) (total number)	
Clinical articles *(Biology only)*	
Books	
Monographs, critical editions, translations (total number)	
Management and coordination of scientific books / Scientific book edition	
Management and coordination of scientific books / Scientific book edition in English or another foreign language	
Book chapters (total number)	1
Book chapters in English or another foreign language	1
Edited theses	
Production in conferences / congresses and research seminars	
Meeting abstracts	23
Articles published in conference proceedings / congress	12
Other products presented in symposia / congress and research seminars	
Electronic tools and products	
Softwares	1
Databases	
Tools for decision making	
Cohorts *(Biology only)*	
Instruments and methodology	
Prototypes	
Platforms and observatories	

Other products	
Theorised artistic creations, staging, movies	
Editorial activities	
Participation in editorial committees (books, collections, etc.)	
Collection and series management	1
Reviewing activities	
Reviewing of articles	23
Grant evaluation (public or charities)	6
Reviewing of research institutes	
Participation in institutional committees and juries (CNRS, Inserm, etc.)	
Academic research grants	
European (ERC, H2020, etc.) and international (NSF, JSPS, NIH, World Bank, FAO, etc.) grants – coordination	
European (ERC, H2020, etc.) and international (NSF, JSPS, NIH, World Bank, FAO, etc.) grants – partnership	
Other European grants - coordination	
Other European grants - partnership	1
National public grants (ANR, PHRC, FUI, INCA, etc.) - coordination	2
National public grants (ANR, PHRC, FUI, INCA, etc.) - partnership	
Local grants (collectivités territoriales) - coordination	1
Local grants (collectivités territoriales) - partnership	
PIA (labex, equipex etc.) grants - coordination	
PIA (labex, equipex etc.) grants - partnership	
Grants from foundations and charities (ARC, FMR, FRM, etc.) - coordination	
Grants from foundations and charities (ARC, FMR, FRM, etc.) - partnership	
Visiting senior scientists and post-docs	
Post-docs (total number)	2
Foreign post-docs	1
Visiting scientists (total number)	
Foreign visiting scientists	
Scientific recognition	
Prizes and/or distinctions	3
IUF members	
Chair of learned and scientific societies	
Organisations of meetings and symposia (out of France)	
Invitations to meetings and symposia (out of France)	
Members' long-term visits abroad	

Strengths

Team members were awarded prestigious prizes: Prime d'excellence scientifique (2014), Maurice Nicloux prize of SFBBM (2018), etc. The team has strong expertise in computational biology. The team has spent a lot of time thinking about how miRNAs bind their targets and which of those interactions are relevant for repression that is meaningful, especially in giving rise to a phenotype. Their current publications are fruits of these efforts. One study demonstrates how cnidarians and plants miRNAs use similar perfectly complementary targeting mode (*Genome Res*, 2014). Another study examined the level of false positive in miRNA prediction programs to conclude that most regulation effect is so weak that the impact is less than the inter-biological replicate fluctuations (*Genome Res*, 2017). Finally they showed by computational analysis that RNA-dependent RNA polymerases (RdRP) is not a unique presence in nematodes (for RNAi), as currently imagined, but also found in many insects. Interestingly, they could not find any evidence for RNAi-generated siRNAs, so they propose that the insect RdRPs might function in new unexplored roles (*PloS Gen*, 2019). The team has also contributed to several other papers.

This team has good visibility in the field, as demonstrated by numerous seminar invitations, and a frequent reviewing for journals. The PI had an ATIPE/Avenir grant and got an ANR, in addition to a local (Canceropole) and international (CEFIC LRI) grant. Only the international grant is currently active.

Weaknesses

There is no obvious weakness to mention, but the questions asked could be developed into more ambitious goals. The idea that many miRNA targets may not experience any effect because of action of miRNAs is widely accepted, as the effects are very weak or balanced by other factors. It is also possible that multiple miRNAs are present on the target, which together can have an effect, so modulating one miRNA may not reveal an impact on target RNA levels. The designed experiments have to take that into account. The team received ANR-ATIP Avenir grant, but current funding situation should improve. Lack of a large stable funding will hinder expansion of the team.

Assessment of scientific outputs, reputation and appeal

The team has very good contributions to the field and is respected by the community.

B – Interactions with the non-academic world, impacts on economy, society, culture or health

From 01/01/2014 to 06/30/2019	Team 20
Socio-economic interactions / patents	
Invention disclosures	
Filed patents	
Accepted patents	
Licenced patents	
Socio-economic interactions	
Industrial and R&D contracts	1
Cifre fellowships	
Creation of labs with private-public partnerships	
Networks and mixed units	

Start-up	
Clinical trials *(Biology only)*	
SIGREC Score *(CHU and CIC only)*	
Expertise	
Consulting	2
Participation in expert committees (ANSES etc.)	
Legal expertise	
Expert and standardization reports	
Public outreach	
Radio broadcasts, TV shows, magazines and newspapers	6
Journal articles, interviews, book edition, videos, other popularization outputs, debates on science and society, etc.	15

Strengths

Outstanding contributions to public outreach. The team made several contributions to the mainstream media: Newspaper *Le Monde* (2015), *Atlantico* website (2015-2019), interviews to newspapers *Le Midi Libre* (2017) *and Le Midi Libre* (2019), interview on radio *Aviva* (2017). Outreach to lay public, retired senior citizens: three events at Universite du Tiers Temps in 2014, organizing visits for high school students to the Institute (every year), communications to middle school students (2016, 2018) and to University students (2018-2019). This list is long and diverse. Truly exceptional performance from the team.

The team has a collaborative project with BASF and the Helmholtz foundation and the PI is consultant for Medesis Pharma SA.

Weaknesses

The panel found none to report.

Assessment of the interactions with the non-academic world

Outstanding contributions to the public at different levels.

C – Involvement in training through research

From 01/01/2014 to 06/30/2019	Team 20
Educational outputs	
Books	
E-learning, MOOCs, multimedia courses, etc.	
Scientific productions (articles, books, etc.) from theses	

Scientific productions (articles, books, etc.) from theses	
Mean number of publications per student *(Biology & Science and technology only)*	
Training	
Habilitated (HDR) scientists	2
HDR obtained during the period	
PhD students (total number)	1
PhD students benefiting from a specific doctoral contract	1
Defended PhDs	
Mean PhD duration	3
Internships (M1, M2)	12
People in charge for a mention or a master's degree course (total number)	
People in charge for a mention or a master's degree course with international certification (Erasmus mundus)	

Strengths

The team has produced 2 habilitated (HDR) scientists and has trained 1 PhD student who published a first-author a methods paper in 2019. One of the two postdocs had an outstanding success in the lab with two first-author publications (*Genome Research*, 2017; *PLoS Genet*, 2019). The team has trained a remarkable number of students over the evaluation period (over 12 Master trainees hosted in the lab) and currently trains a PhD student.

Weaknesses

The lab size is medium (on the lower end), and the number of PhD students trained is limited. This should improve in the coming years.

Assessment of the involvement in training through research

The team has a very good involvement in training junior researchers, particularly Master students and postdocs.

CRITERION 2: TEAM 20 ORGANISATION AND LIFE

The panel decided not to evaluate this criterion for the individual teams.

CRITERION 3: FIVE-YEAR PROJECT AND STRATEGY FOR TEAM 20

Strengths

The team will continue to ask how miRNAs interact with their targets and which specific miRNA target is important from a physiological (phenotype) point of view. The goal is to use the fly miRNA bantam as an example and then mutate the binding sites on a few targets using CRISPR. Compensation experiments with mutated miRNAs that can now bind the mutated target sites will also be prepared. RNAseq will be applied to study the impact on how this will change the overall gene network and contribution to the phenotype. Similar experiments will be carried out in

mammalian cells for the miR-34, an anti-tumorigenic miRNA with poorly understood functions, and its targets. Mutation of each binding site on each target will be correlated to changes in cell proliferation. A few targets that bind the miRNAs with almost perfect complementarity, but with a bulge in the middle can trigger degradation of the miRNA (Target-directed microRNA degradation, TDMD). The team wishes to manipulate novel TDMD targets and measure cognate miRNA levels. These will be carried out in the context of neuronal gene regulation.

Weaknesses

The proposed projects are doable, although not currently funded. The team has to go beyond these safe projects, as they are low risk-low gain projects.

Assessment of the scientific strategy and projects

The overall scientific strategy is very good; it could be more ambitious.

RECOMMENDATIONS TO THE TEAM 20

A – Recommendations on scientific production and activities for the team 20 (criterion 1)

The panel would like to commend the team for their outstanding outreach activities.

B – Recommendations on the team's 20 organisation and life (criterion 2)

The panel decided not to evaluate this criterion for the individual teams.

C – Recommendations on scientific strategy and projects for the team 20 (criterion 3)

The PI is an outstanding computational biologist but that potential is not fully being used in the proposed projects. There is a lack of big challenges. Such ambitious projects with goals that are impactful and relevant for the field will be needed for high-impact publications and for attracting larger grants, which will then allow funding of a medium- to large-sized group that is needed for sustaining good projects. There might be an opportunity to synergize with other wet labs in the institute. While building up a new strong project, the team should strengthen its connections to the cancer field, which may help attract funding from private foundations. Having said that, the panel commends the PI for the output achieved using the limited team size.

Hervé Seitz
IGH (UMR 9002, CNRS et université de Montpellier)
141 rue de la Cardonille
34396 Montpellier
France

July 9, 2020

Object: response to HCERES pre-report

To: HCERES committee for the 2020 evaluation of the IGH.

Dear committee members,

Thank you for your detailed pre-report on our scientific activity. I would like to point out four minor inaccuracies in the section devoted to my lab ("Team 20 – Systemic impact of small regulatory RNAs"):

- In paragraph "Team 20's response to previous recommendations" (p. 157): "Indeed, they published three very good publications as corresponding author studies" should read "Indeed, they published four very good publications as corresponding author studies".
- In table "Team 20 workforce" (p. 157 and 158): supporting personnel (ITAs, BIATSSs and others, notably of EPICs): the number is indeed 0 as of June 30, 2019 (second column of the table), but it should be 1 as of January 1, 2021 (Élisabeth Houbron, holding a permanent CNRS technician position, joined our lab on September 1, 2019). Hence also, the total number of permanent staff members should be 3 (rather than 2) as of January 1, 2021. And a post-doctoral fellow (Germain Busto, holding an FRC post-doctoral fellowship) joined our lab on June 1, 2020; so the number of non-permanent full-time scientists will be 1 on January 1, 2021. As for PhD students (also on p. 157): Sophie Mockly's fellowship runs till October 2021, so she will still be a lab member on January 1, 2021. Hence the non permanent staff (p. 158) will amount to 2 people on January 1, 2021, and the total lab staff will amount to 5 people at that date.
- In paragraph "Strengths" (p. 160): even though the computational analyses described in our *PLoS Genetics* paper dealt with metazoans in general, the experiments dealt only with a cephalochordate. Hence it would be more appropriate to conclude about the functionality of "metazoan" RdRPs, rather than that of "insect" RdRPs.
- Our lab's defining feature is that its activity is shared equally between computational biology and wet lab biology. Even though we happen to, sometimes, analyze other people's data, most of our computational activities are actually devoted to the analysis of our own, in-house generated data. The PI, H. Seitz, now rarely performs experiments by himself, but the staff scientist I. Busseau is a pure experimentalist, just like É. Houbron (lab tech) and G. Busto (postdoc), while the PhD student (S. Mockly) shares her activities equally between bio-informatics and experimental biology. This balanced blend of computation and experiments is actually reflected in our articles (which always tend to mix wet lab and dry lab analyses in similar proportions). Therefore we feel that the recommendations on scientific strategy and projects (on p. 163) should not mention solely our expertise in bio-informatics.

Here is a summary of these modifications we suggest:

On p. 157:

On p. 157:

T20: Systemic impact of small regulatory RNAs		
Active staff	**Number 06/30/2019**	**Number 01/01/2021**
Full professors and similar positions	0	0
Assistant professors and similar positions	0	0
Full time research directors (Directeurs de recherche) and similar positions	1	1
Full time research associates (Chargés de recherche) and similar positions	1	1
Other scientists ("Conservateurs, cadres scientifiques des EPIC, fondations, industries, etc.")	0	0
High school teachers	0	0
Supporting personnel (ITAs, BIATSSs and others, notably of EPICs)	0	~~0~~ 1
Permanent staff	**2**	~~2~~ 3
Non-permanent professors and associate professors, including emeritus	0	
Non-permanent full time scientists, including emeritus, post-docs (except PhD students)	0	1
PhD Students	1	1
Non-permanent supporting personnel	0	

On p. 158:

Non permanent staff	**1**	**2**
Total	**3**	~~2~~ 5

On p. 160:

Strengths

Team members were awarded prestigious prizes: Prime d'excellence scientifique (2014), Maurice Nicloux prize of SFBBM (2018), etc. The team has strong expertise in computational biology. The team has spent a lot of time thinking about how miRNAs bind their targets and which of those interactions are relevant for repression that is meaningful, especially in giving rise to a phenotype. Their current publications are fruits of these efforts. One study demonstrates how cnidarians and plants miRNAs use similar perfectly complementary targeting mode (*Genome Res*, 2014). Another study examined the level of false positive in miRNA prediction programs to conclude that most regulation effect is so weak that the impact is less than the inter-biological replicate fluctuations (*Genome Res*, 2017). Finally they showed by computational analysis that RNA-dependent RNA polymerases (RdRP) is not a unique presence in nematodes (for RNAi), as currently imagined, but also found in many ~~insects~~ metazoans. Interestingly, they could not find any evidence for RNAi-generated siRNAs, so they propose that the ~~insect~~ metazoan RdRPs might function in new unexplored roles (*PloS Gen*, 2019). The team has also contributed to several other papers.

This team has good visibility in the field, as demonstrated by numerous seminar invitations, and a frequent reviewing for journals. The PI had an ATIPE/Avenir grant and got an ANR, in addition to a local (Cancéropole) and international (CEFIC LRI) grant. Only the international grant is currently active.

On p. 163:

C – Recommendations on scientific strategy and projects for the team 20 (criterion 3)

and RNA biologist

The PI is an outstanding computational biologist but that potential is not fully being used in the proposed projects. There is a lack of big challenges. Such ambitious projects with goals that are impactful and relevant for the field will be needed for high-impact publications and for attracting larger grants, which will then allow funding of a medium- to large-sized group that is needed for sustaining good projects. There might be an opportunity to synergize with other wet labs in the institute. While building up a new strong project, the team should strengthen its connections to the cancer field, which may help attract funding from private foundations. Having said that, the panel commends the PI for the output achieved using the limited team size.

With very best regards,

Hervé Seitz