Neurophysiologie respiratoire expérimentale et clinique

Rapport Hcéres

agence d'évaluation de la recherche
et de l'enseignement supérieur

Department for the evaluation of research units

AERES report on unit:

Experimental and Clinical Respiratory Neurophysiology

Under the supervision of the following institutions and research bodies:

Université Paris 6 - Pierre et Marie Curie

December 2012

agence d'évaluation de la recherche
et de l'enseignement supérieur

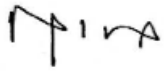
Research Units Department

President of AERES

Didier Houssin

Research Units Department

Department Head



Pierre Glaudes

The president of AERES "signs[...], the evaluation reports, [...]countersigned for each evaluation department by the relevant head of department (Article 9, paragraph 3, of french decree n°2006-1334 dated 3 november 2006, revised).

Grading

Once the visits for the 2012-2013 evaluation campaign had been completed, the chairpersons of the expert committees, who met per disciplinary group, proceeded to attribute a score to the research units in their group (and, when necessary, for these units' in-house teams).

This score (A+, A, B, C) concerned each of the six criteria defined by the AERES.

NN (not-scored) attached to a criteria indicate that this one was not applicable to the particular case of this research unit or this team.

Criterion 1 - C1: Scientific outputs and quality;
Criterion 2 - C2: Academic reputation and appeal;
Criterion 3 - C3: Interactions with the social, economic and cultural environment;
Criterion 4 - C4: Organisation and life of the institution (or of the team);
Criterion 5 - C5: Involvement in training through research;
Criterion 6 - C6: Strategy and five-year plan.

With respect to this score, the research unit concerned by this report received the following grades:

- Grading table of the unit: Experimental and Clinical Respiratory Neurophysiology

C1	C2	C3	C4	C5	C6
A	A+	A+	A+	A	A+

Evaluation report

Unit name:	Experimental and Clinical Respiratory Neurophysiology
Unit acronym:	
Label requested:	UMRS (INSERM – Université Pierre et Marie Curie, Paris 6)
Present no.:	ER 10 UPMC
Name of Director (2012-2013):	Mr. Christian STRAUS
Name of Project Leader (2014-2018):	Mr. Thomas SIMILOWSKI

Expert committee members

Chair:

Mr. Jorge BOCZKOWSKI, Institut Mondor, Créteil, France

Experts:

Ms. Esther BARREIRO, Institut Hospital del Mar d'Investigacions Mèdiques, IMIM, Barcelona, Spain

Ms Florence CAYETANOT, Institut de Neurosciences de la Timone, Marseille

Mr. Jean-Pascal LEFAUCHEUR, Hôpital Henri Mondor, Créteil

Mr. Vincent NINANE, CHU Saint-Pierre, Brussels, Belgium

Scientific delegate representing the AERES:

Mr. Yves TROTTER

Representative(s) of the unit's supervising institutions and bodies:

Mr. Jean-François CHABOT, CNU

Ms. Christelle GUIBERT, INSERM

1 • Introduction

History and geographical location of the unit:

The unit ER 10 UPMC (mono team) was created in January 2009. This creation corresponds to the renewal of the "Equipe d'Accueil" EA 2397 created in 2007 under the title of "Biology and Physiology of neuro-respiratory and cardio-pulmonary interactions". Since January 2012 the ER 10 UPMC changed the title for "Experimental and Clinic Respiratory Neurophysiology".

The unit ER 10 UPMC builds on 2 experimental laboratories and 1 clinical department; these structures are located in the Pitié Salpétrière School of Medicine and Hospital. The 2 laboratories are i) the "Respiratory control physiology and plasticity laboratory", which is devoted to animal research and specifically to the study of isolated central nervous system preparations, and ii) the "Respiratory pathophysiology laboratory" devoted to research in human beings. The clinical department called "R3S" ("Respiration, Réanimation, Réhabilitation, Sommeil") is located in the Pitié-Salpetrière Hospital and includes 3 medical services: Pneumology and medical critical care, Respiratory Functional Explorations, and Sleep pathology. The first 2 medical services constitute the adult branch of the French National Reference Center on Ondine syndrome (directed by Mr. Christian STRAUS). The Pneumology and medical critical care services take part of the National Reference Center on Amyotrophic Lateral Sclerosis. The R3S department is associated with the "Institut Hospitalo Universitaire A-Neurosciences".

Management team:

Mr. Christian STRAUS is the director of the ER 10 UPMC since 2009 and Mr. Thomas SIMILOWSKI is the assistant director, particularly in charge of students management. Both Mr. Christian STRAUS and Mr. Thomas SIMILOWSKI together ensure the scientific direction of the unit. From 2014, Mr. Thomas SIMILOWSKI will be the director of the new unit and Mr. Christian STRAUS will take over as assitant director.

AERES nomenclature:

SVE1_LS4

Unit workforce:

Unit workforce	**Number as at 30/06/2012**	**Number as at 01/01/2014**	2014-2018 **Number of project producers**
N1: Permanent professors and similar positions	9	9	9
N2: Permanent researchers from Institutions and similar positions (hospital physicians)	6 (1,4)	6 (1,4)	4
N3: Other permanent staff (without research duties) (secretary)	1 (0,4)	1 (0,4)	
N4: Other professors (Emeritus Professor, on-contract Professor, etc.)			
N5: Other researchers from Institutions (Emeritus Research Director, Postdoctoral students, visitors, etc.)	3 (post-doctoral fellows)	1	
N6: Other contractual staff (without research duties)	2 (research engineers)		
TOTAL N1 to N6	**21** (15,8)	**17** (11,8)	13

Percentage of producers	***100.00 %***

Unit workforce	Number as at 30/06/2012	Number as at 01/01/2014
Doctoral students	6	
Theses defended	10	
Postdoctoral students having spent at least 12 months in the unit*	2	
Number of Research Supervisor Qualifications (HDR) taken	2 (one of them on Oct 23, 2012)	
Qualified research supervisors (with an HDR) or similar positions	8	7

2 • Assessment of the unit

Strengths and opportunities:

The strength of the unit is illustrated by its bidirectional translational approach between animal models and diseased humans, going from basic research to applied research in the fields of diagnosis and treatment of respiratory diseases. This particularity, which is encouraged by both French and European research bodies, is possible thanks to the participation of clinicians and non-clinicians faculty members in the unit staff. This team has a chance to build on a particularly rich hospital environment, adapted to the themes of this research team, with close partnership. Links to neuroscience labs in Pitié Salpétrière were established. This is a strong point for a team primarily involved in clinical research.

This is the unique unit in France studying the control of ventilation analyzing cortical and bulbopontic respiratory network generating structures in humans and animals, and using integrated approaches and small animal models. The studied pathologies such as the Ondine syndrome, amyotrophic lateral sclerosis, or problems encountered in critical care medicine after a long period under mechanical ventilation are very important in terms of public health at national and international levels.

This unit has a wide network of established national and international collaborations, and new collaborations are considered in the research project. These elements indicate that this unit possesses a clear national and international recognition.

Funds are diversified, coming from different sources and increasing over time (1.000.000 euros last year). Funding from university is a minor part of the global funding of the unit. The unit has filled 4 patents, one in collaboration with the CRICM (Institut du Cerveau et de la Moelle Epinière), and initiated contacts with companies for industrial applications. The unit is supported by the “Pôle de Compétitivité” Médicen. Implanted phrenic stimulation was recognized as a therapeutic act in France based on studies of the unit.

The unit is attractive with many doctoral and master students each year, with EC and PH and this is realized by the arrival of three new members in 2012, including two Professors that reinforced the animal pole of the unit. It has to be stressed that 3 foreign post-docs joined the unit the last 4 years coming from Canada, Italy and Australia respectively. They are funded by European grants or grants from their own countries.

The human environment and relationships among unit members are excellent.

Weaknesses and threats:

The size of the unit (number of searchers and size of laboratories) is rapidly improving but still remains limited for its ambitious projects. It lacks of full-time researchers.

Administrative management needs to be strengthened; one secretary (40 % part-time) to manage a continuously growing budget and unit in expansion does not seem adequate.

The laboratories on the pole “animal” unit require renovation.

Recommendations:

The originality and the structure of the unit should be preserved while improving its foundation but also its link and interdependence with neuroscience research structures and units in France, and when possible in Europe. This last point could allow the unit to access to European funding.

Identify emerging principal investigators in the different research areas.

Improve administrative management and laboratories for animal research.

3 • Detailed assessments

Assessment of scientific quality and outputs:

This very homogeneous research team is characterized by a positioning on the border between neuroscience and respiratory physiology. This positioning is quite rare, and it should be emphasized that particular skills have been acquired by this team in the areas of advanced neurophysiology, such as non-invasive brain stimulation, while the formation of most of the team members is essentially clinical pneumologic.

Collectively, investigators of this unit published numerous papers (112 since 2007 in international peer reviewed journals) in many different journals including the best in their fields of research. One can cite articles in the best journals of respiratory medicine (3 articles in the *AJRCCM –IF 11-*, 3 in *Thorax –IF 6.9-* , 5 in *ERJ –IF 5.9-*, and 2 in *Chest –IF 5.2-*), critical and intensive care medicine (3 articles in *Crit Care Med –IF* 6.3-, 6 in *Intensive Care Med –IF 5.4-*), anesthesiology (2 articles in *Anesthesiology –IF*), and Physiology (1 article in *J Physiol*, 6 in *J Appl Physiol*).

Eight among the 10 PhD thesis defended during the last 4 years have resulted in at least one publication.

Four patents were filled during the last 4 years, 3 of them are related to a brain-ventilator interface and 1 is related to a device for medical remote monitoring. Industrial partnerships were built on some of these patents.

The research axes developed by the unit are highly innovative and original:

- The demonstration of an analogy between afferent pathways involved in certain types of dyspnea and nociceptive afferent pathways, set up the basis for new therapeutic strategies of dyspnea, such as utilization of non-morphinic analgesics.

- Members of the unit investigated the origin of the non-linear complexity of ventilation in an amphibian model, and demonstrated that this complexity relies in one of the two oscillators contributing to the automatic control of respiration in brainstem. They also showed that this is also the case in humans, in which in addition the ventilator complexity can be aggravated in clinical situations such as alterations in the set-up of mechanical ventilators in critical care patients.

- Members of the unit described new and original treatments of i) sleep apneas syndrome in patients with chronic venous insufficiency by preventing fluid accumulation in the legs during the day, and its nocturnal displacement into the neck by wearing compression stockings during the day; ii) Ondine syndrome in adults, by administrating progesterone analogs, which improves respiratory response to CO2, and iii) amyotrophic lateral sclerosis, by developing phrenic pacing.

Finally, the works on the cortical response to inspiratory mechanical loads illustrates the high originality of the research. These last observations performed in normal humans and in patients offer the opportunity of research and development in the field of mechanical ventilation using new ventilators that could be driven by the electroencephalogram (EEG).

Assessment of the unit's academic reputation and appeal:

A limited number of groups in the world are working in the field of respiratory neurophysiology but this unit can be considered as one of the world leading groups with an excellent scientific reputation. The unit has also close collaboration with the other leading groups in the same field (e.g. dyspnea laboratory, Harvard University, Boston; MIT, Boston; University of Laval, Canada) and with many research units in France. As an example, in the field of the cortical control of ventilation, the unit is the leader of a national project supported by the ANR that will implicate four other teams.

Some members of the unit are/have been members of the Editorial Board of well-known journals including the Journal of Applied Physiology, Respiratory Physiology and Neurobiology and the European Respiratory Journal and members of the unit are regularly invited to speak at national and international meetings (52 invited conferences in meetings, and 44 oral presentations in national meetings with publication of proceedings).

The unit has recruited several professors (2 PU and 1 MCU, 1 MCU-PH), doctors (4 PH) and 3 foreign postdoctoral students who are still present in 2012 and the total number of members of the unit has increased from 8 to 21 between 2007 and 2012.

The ability of the unit to raise funds other than those from Paris 6 University and to get successful applications from highly competitive funding increased constantly since 2007: ANR, European community, foundations, federation ANTADIR, PHRC…Grants for more than 1.000000 euros were obtained in 2011 (including PhD and post-docs salaries).

Foreign students and fellows joined the unit during the past 4 years. It has to be noted particularly the case of 3 post-docs of high scientific quality coming from Italy, Canada and Australia respectively and supported by European grants or grants from their own countries.

Assessment of the unit's interaction with the social, economic and cultural environment:

The research activity of the proposed unit is devoted to translational research. Their efforts will be directly involved in finding solutions to socio-economic and health issues generated by breathing disorders, such as ALS, congenital central hypoventilation syndrome, obstructive sleep apneas…

The unit seems to have a good knowledge of the industrial valorization of research as illustrated by the fact that four granted patents have been taken between 2007 and 2012 including 3 patents for the brain-ventilator interface. One of these patents has been made in collaboration with the CR ICM. The unit has also initiated contacts and contracts with companies for industrial application. These companies are well known in the field of respiratory medicine (e.g., Air Liquide Medical Systems for the industrialization of the interface between brain and ventilator). The unit works in very close collaboration with the Valorization and Transfer department (DGRTT) of Pierre and Marie Curie University.

Implanted phrenic stimulation was recognized as a therapeutic act in France based on studies of the unit.

Members of the unit actively participate in the institutions to which they are attached (Second-Dean of the medical faculty Paris VI, member of scientific committees and councils of different Universities in Paris, heads of clinical Departments at the University Hospital). These elements show an important integration of the unit into the academic and university hospital environment.

Members of the unit are actively involved in the diffusion of science and teach at different levels in sciences and medical degrees.

Assessment of the unit's organization and life:

The unit is currently directed by Mr. Christian STRAUS in close association with Mr. Thomas SIMILOWSKI, who is associated Director in charge of the students. Mr. Thomas SIMILOWSKI is the candidate director for the renewed unit.

The frequency of the scientific meetings within the unit but also with the external units involved in development projects seems adequate and a committee of 5 members decides the global scientific orientation of the unit collegially with meetings on demand.

Some aspects of the life of the unit require an urgent action. This is particularly true for the secretariat that is not adequately staffed and the laboratories dedicated to animal research in the Faculty of Medicine that should clearly be renovated to optimize the research works.

The articles are signed by the students and investigators in agreement with their investment in the work, students sign articles in first position if they performed the study. This policy shows that the unit functions as a unit.

Members of the unit are actively involved in research master programs.

During the past 4 years, 15 master students have joined the unit for short or long training periods and members of the unit have also trained or currently train 15 PhD students. Some students from other countries chose the unit to fulfill their master degree or PhD.

Assessment of the five-year plan and strategy:

Projects of the unit are coherent and well justified. They are in continuity with previous results and combine basic and clinical components. This translational research approach should improve and identify innovative ways of treatment of patients with different respiratory disorders.

The project on "sub cortical determinants of ventilation" is realistic and original. The evaluation of progesterone analogs in the treatment of Ondine syndrome is particularly innovative, since no treatment is available for this disease. Some aspects of this study involve utilization of new animal models, particularly, mice with mutations in genes involved in certain pathologies, such as Ondine syndrome. These animals are already available thanks to collaboration with Mr. Jorge GALLEGO (Inserm U676) and Mr. Jean-François BRUNET and Mr. Christo GORIDIS (UMR 8542-ENS). Use of these animals will allow better understanding the effects of progesterone analogs on respiratory control and thus potentially allowing the development of new therapeutic strategies of the disease.

The link between experimental and clinical research is clearly expressed in the project related to the implantable phrenic pacemaker improving the quality of life and slowing progression of respiratory lateral amyotrophic sclerosis. Surgical techniques will be improved using a model of mechanically ventilated sheep and then the understanding of the mechanisms underlying the influence of phrenic stimulation of diaphragm structure will be evaluated on human samples through collaboration with the UMRS 974.

The project on the "cerebral cortex and respiration" is based on the previous findings of the unit on the cortical response to inspiratory mechanical loads and intends to develop a patient-ventilator interface system allowing increasing harmony between the ventilator and the patient. It implies already existing collaboration with teams having expertise in EEG signal treatment before testing the concept in ventilated patients, the final point being the industrial valorization. The global project is very original, coherent and feasible in a period of 5 years and the projected collaborations should allow avoiding technical drawbacks and limiting the risk-taking. The Stimpnée and the Nocipnée projects will explore neurophysiological determinants of dyspnea and new potential therapeutic applications. These studies are important since the direct treatment of the sensation of dyspnea remains very limited nowadays and new therapeutic approaches are required. Here too, the feasibility within 5 years is clear, the risk-taking is very limited and the unit has developed all the methodology to perform these two last projects.

4 • Conduct of the visit

Visit date:

Start: 05/12/2012 at 8:30 AM

End: 05/12/2012 at 6:30 PM

Visit site:

Institution: Pitié-Salpêtrière

Address : 91 boulevard de l'Hôpital, 75013, Paris

Conduct or programme of visit:

8h30 - 9h00 Huis clos - Présentation de l'AERES au comité par le Délégué Scientifique

9h00 - 9h15 Devant l'unité, présentation du Comité de visite et Présentation de l'AERES par le Délégué Scientifique

9h15 -10h00 Présentation de l'unité : bilan et projets

- Mr. Christian STRAUS/ Mr.Thomas SIMILOWSKI

10h -12h30 Audition des thèmes

10h00 – 11h15 Déterminants sous-corticaux du contrôle ventilatoire

25 mn pour chaque projet (présentation - discussion)

Modèles murins : effets des progestatifs sur le contrôle ventilatoire

- Ms. Laurence BODINEAU, Ms. Marie-Noëlle FIAMMA

Pathologies humaines : approches pharmacologiques des anomalies du contrôle ventilatoire

- Mr. Christian STRAUS

Pathologies humaines : la neurostimulation respiratoire comme substitut du contrôle ventilatoire

- Mr. Thomas SIMILOWSKI, Mr. Jésus GONZALEZ-BERMEJO, Mr. Jalal ASSOUAD

11h15 – 11h30 Pause

11h30 – 12h45 Cortex cérébral et respiration

25 mn pour chaque projet (présentation - discussion)

Neurophysiologie de la dyspnée : modulation de la connectivité corticale et contrôle ventilatoire

- Mr. Louis LAVIOLETTE, Mr. Thomas SIMILOWSKI

Neurophysiologie de la dyspnée : approches psychophysiologiques et pharmacologiques innovantes

- Ms. Capucine MORELOT-PANZINI

Contrôle moteur de la ventilation et contraintes ventilatoires : vers une interface cerveau-ventilateur

- Ms. Anna HUDSON, Mr. Mathieu RAUX

12h45 -14h00 Déjeuner de travail

SESSION RENCONTRE AVEC LE PERSONNEL PERMANENT ET NON PERMANENT

14h -14h45 : Rencontre avec les doctorants et post-doctorants et/ou CDD « chercheurs », Ingénieurs

Auditoire : membres du Comité, Délégué Scientifique AERES, sans les Tutelles, ni la Direction

Rencontre avec les chercheurs et enseignants chercheurs titulaires.

Auditoire : membres du Comité, Délégué Scientifique AERES, sans les Tutelles, ni la Direction, ni les responsables d'Equipes

14h45-15h Pause

15h-15h45 Rencontre avec les représentants de la Tutelle:

Auditoire : membres du Comité, Délégué Scientifique AERES

15h45-16h15 Rencontre avec la direction de l'unité

Auditoire : membres du Comité, Délégué Scientifique AERES

16h30-18h30 Réunion du comité à huis clos

Présence : membres du Comité, Délégué Scientifique AERES

5 • Statistics by field: SVE on 10/06/2013

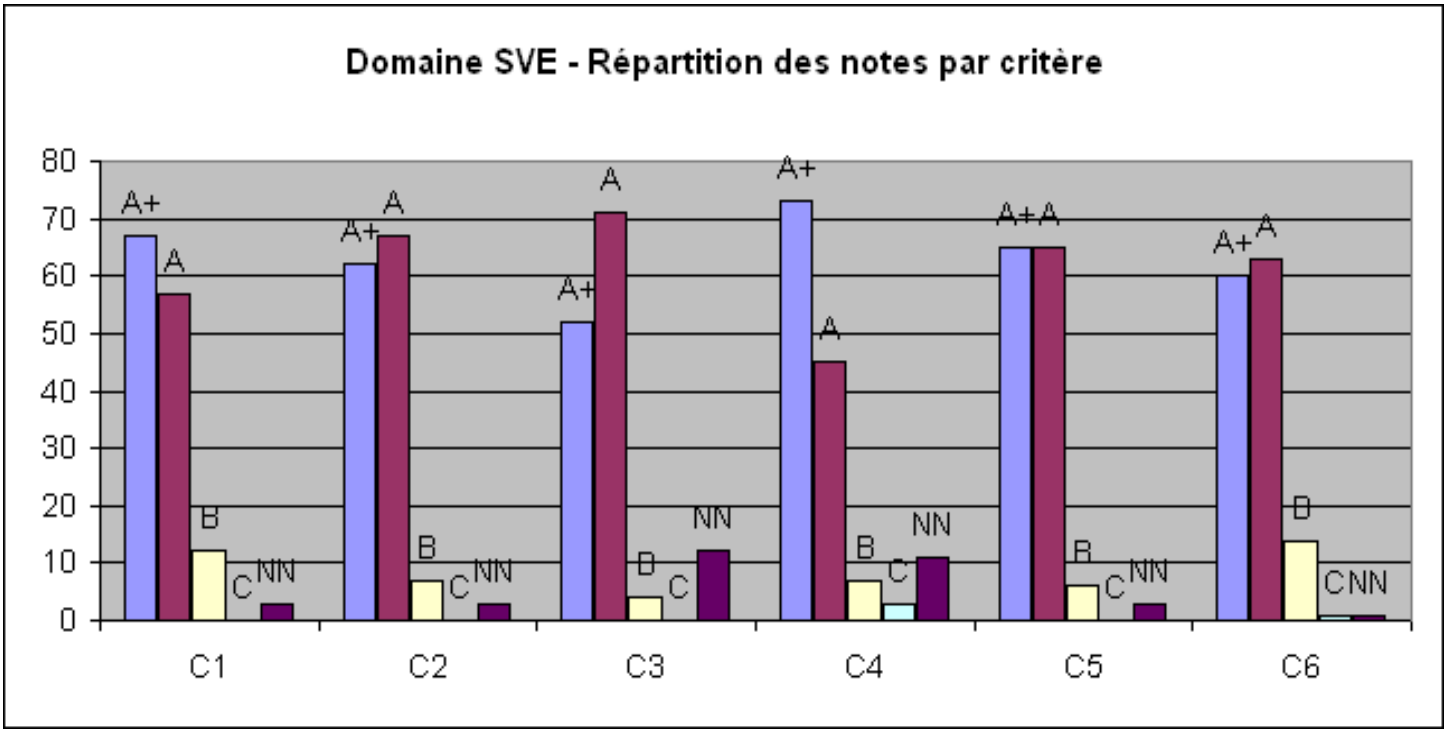
Grades

Critères	C1 Qualité scientifique et production	C2 Rayonnement et attractivité académiques	C3 Relations avec l'environnement social, économique et culturel	C4 Organisation et vie de l'entité	C5 Implication dans la formation par la recherche	C6 Stratégie et projet à cinq ans
A+	67	62	52	73	65	60
A	57	67	71	45	65	63
B	12	7	4	7	6	14
C	0	0	0	3	0	1
Non Noté	3	3	12	11	3	1

Percentages

Critères	C1 Qualité scientifique et production	C2 Rayonnement et attractivité académiques	C3 Relations avec l'environnement social, économique et culturel	C4 Organisation et vie de l'entité	C5 Implication dans la formation par la recherche	C6 Stratégie et projet à cinq ans
A+	48%	45%	37%	53%	47%	43%
A	41%	48%	51%	32%	47%	45%
B	9%	5%	3%	5%	4%	10%
C	0%	0%	0%	2%	0%	1%
Non Noté	2%	2%	9%	8%	2%	1%

Histogram



6 • Supervising bodies' general comments

Paris le 10 04 2013

Le Président
Didier Houssin
Agence d'évaluation de la recherche
et de l'enseignement supérieur
20 rue Vivienne - 75002 PARIS

M. le Président,

Nous avons pris connaissance avec le plus grand intérêt de votre rapport concernant le projet du laboratoire de Neurophysiologie Respiratoire Expérimentale et Clinique, porté par M. Similowski. Nous tenons à remercier l'AERES et le comité pour l'efficacité et la qualité du travail d'analyse qui a été conduit.

Ce rapport a été transmis au directeur du laboratoire qui nous a fait part en retour de ses commentaires que vous trouverez ci-joint. Nous espérons que ces informations vous permettront de bien finaliser l'évaluation du laboratoire.

Restant à votre disposition pour de plus amples informations, je vous prie de croire, M. le Président, à l'expression de mes salutations respectueuses.

Le Vice -Président Recherche et Innovation

Paul Indelicato

Vice-présidence Recherche et Innovation
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SORBONNE UNIVERSITÉS

ER 10 UPMC
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***Ref* : D2014-EV-0751722P-S2PUR140005620-002329-RT_similowski**

Comments on the AERES report on unit:

ER10upmc

Experimental and Clinical Respiratory Neurophysiology

Part 1 _ General observations

Paris, March 18, 2013

Section 1: Introduction

Page 3, under "management team":
- a sentence reading "Mr Straus will take over as assistant director" is missing after "From 2014, Mr Similowski will be the director of the unit".

Section 2: Assessment of the unit Weaknesses and threats & Recommandations

1- "The size of the unit (number of searchers and size of laboratories) is rapidly improving but still remains limited for its ambitious projects. It lacks of full-time researchers."

The unit is well aware of strengthening its research staff. As mentioned during the AERES visit, there are ongoing discussions with several putative additional staff members. Since the visit, the unit recruited Ms Hurbault, a psychologist, to contribute to the dyspnea research from the clinical point of view. Advanced negociations are ongoing with a university professor who should probably join the unit at the end of 2013.

Regarding full-time researchers, one of the contacts mentioned during the site visit has now materialized. Mrs. Caroline Sevoz-Couche, CR1 with Inserm, has taken the necessary steps to join the unit as soon as possible. Mrs Caroline Sevoz-Couche is a researcher specialized in the study of autonomic regulations and on the effects of stress on these regulations. She has a strong cardiovascular focus that she now wishes to enlarge to respiratory aspects. Projects and collaborations with members of the ER10 UPMC have been started as of January 2013.

2- "Administrative management needs to be strengthened; one secretary (40 % part-time) to manage a continuously growing budget and unit in expansion does not seem adequate." … "Improve administrative management"

The unit is also well aware of its weakness regarding administrative support. This was already pointed at during the 2008 site visit by the AERES, and communicated to the University. The unit has, in addition to the standard procedure for "IATOS" recruitment, directly alerted the "DGRTT" and the presidency of Paris 6 university about the difficulties that

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the growing budget of the unit creates. The unit has good hope that this situation will evolve favorably in the near future.

3- "The laboratories on the pole "animal" unit require renovation." …"Improve … laboratories for animal research."

Since the filing of the project and the communication of the AERES report, 2 of the 3 additional rooms that were assigned to the ER10 UPMC in the department of physiology (7th floor of building 91 Bd de l'Hôpital-Faculty of Medicine Pitié-Salpêtrière) have been fully renovated. This has allowed the unit to significantly improve its environment and work surface.

In addition, the unit, as a component of the department of physiology, has been integrated to a consortium aiming at an in-depth restructuration of the "91" building of the Faculty of Medicine (project titled "Fédération Pitié", filed to "région Ile-de-France"). Within the frame of this project, the unit could possibly both finalize its renovation process and expands its research infrastructures in the perspective of the above mentioned recruitments.

4- "The originality and the structure of the unit should be preserved while improving its foundation but also its link and interdependence with neuroscience research structures and units in France, and when possible in Europe. This last point could allow the unit to access to European funding."

In addition to the existing link between the clinical department "R3S" and the IHU A-Neurosciences, the unit intends to formally associates itself with the "Centre de Recherche de l'Institut du Cerveau et de la Moëlle épinière". This would be logical in view of its research orientations and in view of the current collaborative projects with several CR-ICM teams. This association has already been discussed with the CR-ICM directors and has been approved, provided that the unit application for INSERM-UPMC labellisation (UMRS) is granted.

5- "Identify emerging principal investigators in the different research areas."

In answer to this remark that was made during the AERES site visit, the unit has formally identified several research thematics within its general research activity. The corresponding principal investigators have also been identified. This has been formalized in the document affiliating the unit to the "Ecole Doctorale" ED394 for 2013. Within the "cortical control of breathing" theme supervised by Thomas Similowski, a "brain-ventilator interface" sub-theme is directed by Mathieu Raux, and a "pathophysiology and pharmacology of dyspnea" sub-theme is directed by Capucine Morélot-Panzini. The "autonomic breathing control" theme is co-directed by Laurence Bodineau (animal studies) and Christian Straus (human studies). The "respiratory neurostimulation" theme is supervised by Jalal Assouad (animal studies) and Jésus Gonzalez-Bermejo (human studies).

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Section 3: Detailed assessments
Interaction with the social, economic and cultural environment

The unit wishes to insist on two complementary information in this section.

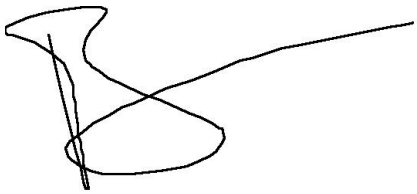
Firstly, members of the unit actively participate in institutions external to Paris 6 university. For example, the unit applicant director chairs the joint scientific council of the "Fondation du Souffle" and "Fonds de Dotation Recherche en Santé Respiratoire", that has become the first non-academic funding structure for respiratory research in France.

Secondly, the unit and the R3S department work in close collaboration with patients' associations ("Association Française pour le Syndrome d'Ondine" -AFSO-, "Association pour la Recherche sur la Sclérose Latérale Amyotrophique" - ARSla-). Some of the unit's researches are funded by these associations. In return, they are kept closely informed of the corresponding results, with interventions in their internal media and during assemblies. The AFSO has supported 1 human project and 3 animal projects. The ARSla has complemented the PHRC grant devoted to diaphragm pacing in amyotrophic lateral sclerosis.

Assessment of the unit's organization and life

6- Some aspects of the life of the Unit require an urgent action. This is particularly true for the secretariat that is not adequately staffed and the laboratories dedicated to animal research in the Faculty of Medicine that should clearly be renovated to optimize the research works.

See above, under "Section 3", points 2 and 3.



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