EPV - Emergence des pathologies virales

Rapport Hcéres

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

Section des Unités de recherche

AERES report on the research unit

Emergences des Pathologies Virales

From the

University of Aix-Marseille 2

Institut de Recherche pour le Développement (IRD)

Ecole des Hautes Etudes en Santé Publique (EHESP)

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Le Président de l'AERES

Didier Houssin

Section des unités de recherche

Le Directeur

Pierre Glorieux

January 2011

Research Unit

Name of the research Unit: Emergence des Pathologies Virales

Requested label: UMR_D IRD

N° in case of renewal: UMR 190

Name of the director: M. Xavier DE LAMBALLERIE

Members of the review committee

Committee chairman:

M. Fabien ZOULIM, INSERM, Lyon, France

Other committee members:

M. Franz HEINZ, Medical University of Vienna, Austria

M. Stephan GÜNTHER, Bernhard Nocht Institute for Tropical Medicine, Hamburg, Germany

M. Gérard CUNY, IRD, Montpellier (CSS IRD)

M. Jacques IZOPET, CHU Purpan, Toulouse(CNU)

Observers

AERES scientific advisor:

M. Yves GAUDIN

University, School and Research Organization representatives:

M. Pierre CHIAPPETTA (University of Aix-Marseille 2)

M. Hervé TISSOT-DUPONT (IRD)

M. Antoine FLAHAUT (EHESP)

Report

1 • Introduction

- **Date and execution of the visit:**

The visit was performed the 14th of January 2011. After the introduction talk from the director, the main PIs presented their work and project. This was followed by a general discussion focusing on science first, then on governance and general strategy. The committee then met successively, in the absence of the director, with students and post-docs, technicians and engineers, researchers and teachers/researchers. The visit ended by a debriefing of the committee.

- **History and geographical localization of the research unit, and brief presentation of its field and scientific activities:**

The research Unit is localized in Marseille.

It was created in January 2008 following a major restructuration of a former unit in terms of scientific strategy and staff allocation.

The field of scientific activities of the Unit is on emerging viral infections.

- **Management team:**

The management team is composed of the scientific director and two administrative assistants.

- **Staff members (on the basis of the application file submitted to the AERES):**

N1: Number of researchers with teaching duties (Form 2.1 of the application file)	3	9
N2: Number of full time researchers from research organizations (Form 2.3 of the application file)	4	4
N3: Number of other researchers including postdoctoral fellows (Form 2.2 and 2.4 of the application file)	4	7
N4: Number of engineers, technicians and administrative staff with a tenured position (Form 2.5 of the application file)	8	9
N5: Number engineers, technicians and administrative staff without a tenured position (Form 2.6 of the application file)	9	5,5
N6: Number of Ph.D. students (Form 2.7 of the application file)	10	7
N7: Number of staff members with a HDR or a similar grade	5	9

2 • Overall appreciation on the research unit

- **Summary:**

This is a unique laboratory working on a very important topic of infectious diseases, i.e. emerging viral infections. This research topic is especially relevant in the light of RNA viruses including chikungunya, dengue viruses, H1N1 infections which have recently led to clinically important outbreaks. The research group is mainly interested in basic virological research, medical virology, and public health aspects of emerging viral infections. It is one of the few laboratories which are able to respond in a timely manner to emerging viruses, in terms of epidemiology and diagnosis. The Unit has developed successfully the infrastructure and modus operandi for preparedness to emerging viral infections. The general feeling of the evaluation committee was very positive as the research group has now reached a very high international standard in this scientific field. The committee was impressed by the implementation of the technologies required to cover any emerging viruses.

- **Strengths and opportunities:**

The Unit has developed a unique expertise for the identification and diagnosis of human pathogenic viruses (approximately 75 viruses can be covered currently). The laboratory is expert in handling highly pathogenic viruses in BSL3 facilities. It is now prepared for future emerging viral infections and has shown recently its reactivity in such case. The scientific strategy includes a nicely thought balance between basic science and medical virology. It includes a broad approach with viral genomics, entomology, public health and epidemiology studies which represent an additional asset. The team enters soon into an institutionalised collaboration with the school of public health (EHESP). The combination of medical virology with social science aspects and professional risk assessment is considered a future competitive advantage of the department, in particular for conducting epidemiological studies on emerging viruses. The research team is highly dynamic and was successful to restructure the laboratory, to establish strong international networking. The research team has been extremely successful in fund raising. The Unit has an excellent international visibility in the field of emerging viruses.

- **Weaknesses and threats:**

Since the size of the group has increased significantly because of the success of the research programs and grant applications, a better organization of daily scientific life of students and post-docs should be implemented. One potential threat is the difficulty to maintain sites in the « South » (Laos and Bolivia) without permanent positions for one or two molecular virologists to manage research, training, and administration at these sites.

- **Recommendations:**

The committee suggests to implement weekly journal club and lab meetings for a better organization of the daily scientific life and supervision of students and post-docs.

The committee members encourage the Unit to continue and go further on the work on experimental virology including antiviral research, attenuation studies, transmission studies, viral genome evolution studies.

- **Production results:**

A1: Number of permanent researchers with teaching duties (recorded in N1) who are active in research	3
A2: Number of permanent researchers without teaching duties (recorded in N2) who are active in research	4
A3: Ratio of members who are active in research among staff members [(A1 + A2)/(N1 + N2)]	1
A4: Number of HDR granted during the past 4 years	1
A5: Number of PhD granted during the past 4 years	12

3 • Specific comments

- **Appreciation on the results :**

The scientific results have led to major achievements in viral genomics. The research team has generated a large amount of viral genome data for emerging viruses that were critical not only to develop diagnostic assays but also to perform functional studies that were done in collaboration with another team in Marseille working in the field of structural virology (one of the major scientific breakthrough was the discovery of the Endonuclease structure of the arena virus L protein, which resulted in a recent publication in Plos Pathogen). The unit has developed a unique strategy of translational research covering the identification of field viruses, the development of diagnostic methodologies, and epidemiology studies. The unit has also shown its capacity for an immediate response to an emerging outbreak, as they were successful with the chikungunya and influenza H1N1 outbreaks to develop new assays and initiate new research programs on these topics.

Since 2008, the team has published 123 scientific articles among which 56 signed as first or last author by a member of the Unit. Among the latter, several have been published in respected, specialized journals: 1 PLoS Pathogens (IF=9), 6 Emerging Infect Diseases (IF=6.8), 1 PLOS Neglected tropical diseases (IF=4.7), 3 PLoS One (IF=4.3), 2 Antiviral Research (IF=3.6), 1 J Gen. Virol. (IF=3.2), 2 Virology (IF=3.0).

One paper in collaboration was published in Journal of Clinical Investigation on experimental studies of Chikungunya infection.

As mentioned above, the Unit has a strong collaboration with a team of structural virology leading to major results and many publications.

The committee has highlighted the high number of publications with respect to the mission, i.e. the rapid publication of virological findings relevant to public health, but also the side effects of this mission which can have a negative impact on the impact factor of the publications (impact factors of corresponding journals are often not be very high).

A very good number of PhD Thesis (12) supervised during the evaluation period.

The unit has developed a very strong scientific network at the international level. An institutional collaboration with EHESP has been initiated and will be a major asset in the future. The strategy of the Unit was to reduce the number of overseas sites and to select two major sites in Laos and Bolivia for its research projects.

Partners of previous programs, especially VIZIER, will be the basis of the antiviral research program proposed in the current application and the SILVER project.

- **Appreciation on the impact, the attractiveness of the research unit and of the quality of its links with international, national and local partners:**

The Unit has attracted one visiting professor from Oxford University for 4 years who is managing the EC funded SILVER program. Furthermore, the Unit has attracted one professor from Marseille University who manages the EVA program (European virus archive) one IRD researcher, and two post-docs.

The Unit was extremely successful in fund raising with two new EC grants within the FP7, EVA and Silver with a very high level funding (6.3 M euros for EVA and 12.9 M euros for SILVER), both of them being coordinated by UMR190.

It was also very successful with national grant applications at ANR and PHRC.

The Unit has demonstrated a strong capacity of fund raising for its research programs which are all funded either by national or EC grants.

As a follow-up of the VIZIER program, they have developed an Industrial partnership in the SILVER project that includes strong patenting and licensing strategy.

The committee has found an excellent participation in international and national networks especially via the EC grants and the official link with EHESP. A strong partnership exists with the two sites in Laos and Bolivia which includes external support for sustainability (including Welcome Trust and EHESP).

A very strong output in terms of scientific results was recognized by the committee. The unit has obtained very important results in the field of epidemiology of emerging viral infections including transmission and societal aspects. The unit research results and programs have a very strong impact in terms of public health, in light of climate change and global warming which leads to emerging viral infections (spread of mosquitoes, emerging infections with Dengue, Chikungunya etc).

- **Appreciation on the management and life of the research unit:**

The director has followed with efficiency the recommandation of the previous evaluation which were to restructure the Unit with one site in France and two abroad. This was made possible because of a very strong leadership of the director of the unit. The committee recognized the ability and success of the director to restructure the laboratory in a very short time despite unforeseen difficulties.

One important aspect of the unit strategy was to establish an official partnership with the school of public health. The committee has found a very good structuration of the research activities with (1) two main research topics on respiratory viruses and arboviruses and (2) three working groups : on emerging viral infections and genomic studies of RNA viruses, antiviral therapy, and public health studies and soci-epidemiologic studies.

The interview with the research staff showed that people seem to be happy in the laboratory and to work in a very good professional climate. Since the group has enlarged recently, they are in the process of changing the management of the daily scienitfic life although they have already implemented a specific PhD committee with regular reporting for the supervision of PhD students.

The staff members are deeply involved in teaching activities at Marseille University.

The different laboratory members had a strong contribution of in the structuration of the research effort.

The local structuration is based on a diagnostic platform and an industrial transfer platform.

The Unit is also involved in a major project of Marseille University with the creation of University Hospital Institute on Infectious diseases which will integrate the research efforts of all the major local players in the field in Marseille (Evaluation pending).

- **Appreciation on the scientific strategy and the project:**

The research projects will follow three main axis :

- RNA virus genomic studies which is mainly a continuation of the previous sucessful programs.

- Development of an antiviral program funded by EC including resistance studies, experimental studies on transmission and attenuation. A strong link with the chemistry group of Leuven University is a major asset. These studies provide a starting point for hypothesis-driven experimental research.

- Socio-epidemiology program : this is a new program mainly on respiratory viruses and influenza at the national and international level which will include public health studies.

The laboratory has a unique expertise in molecular virology and epidemiology; it will be a major asset to combine both aspects.

The committee found a very nice structuration of the research program with three working groups on two main aspects of emerging viral infections as described above.

The methodology and technology are already in house and the laboratory will be able to respond immediately to any new viral threat.

All projects that were presented are already funded either by two major EC grants coordinated by the leader of the unit or by major national grants: ANR and PHRC.

The unit made the first step to maintain the oversea sites, with the threat of a lack of permanent staff to supervise these sites. On the other hand, they established a partnership abroad with external support for these sites, for instance with the Welcome Trust to ensure the sustainability of the international activities.

The EC funded projects are cutting edge and very ambitious. The focus on Phleboviruses is important as it is the cause of neglected infections with a potentially high medical impact, and is original for this team. The SILVER research program was found very attractive and competitive. The EVA program (repository of clinical isolates) will also be the backbone for their own programs and local/international collaborations by sharing high quality reagents and isolates. The EVA program was seen by the committee as a special asset of the research unit and as a unique contribution to the international community.

Intitulé UR / équipe	C1	C2	C3	C4	Note globale
EMERGENCE DES PATHOLOGIES VIRALES	A	A+	A+	A+	A+

C1 Qualité scientifique et production
C2 Rayonnement et attractivité, intégration dans l'environnement
C3 Gouvernance et vie du laboratoire
C4 Stratégie et projet scientifique

Statistiques de notes globales par domaines scientifiques

(État au 06/05/2011)

Sciences du Vivant et Environnement

Note globale	SVE1_LS1_LS2	SVE1_LS3	SVE1_LS4	SVE1_LS5	SVE1_LS6	SVE1_LS7	SVE2 _LS3 *	SVE2_LS8 *	SVE2_LS9 *	Total
A+	7	3	1	4	7	6		2		30
A	27	1	13	20	21	26	2	12	23	145
B	6	1	6	2	8	23	3	3	6	58
C	1					4				5
Non noté	1									1
Total	**42**	**5**	**20**	**26**	**36**	**59**	**5**	**17**	**29**	**239**
A+	16,7%	60,0%	5,0%	15,4%	19,4%	10,2%		11,8%		12,6%
A	64,3%	20,0%	65,0%	76,9%	58,3%	44,1%	40,0%	70,6%	79,3%	60,7%
B	14,3%	20,0%	30,0%	7,7%	22,2%	39,0%	60,0%	17,6%	20,7%	24,3%
C	2,4%					6,8%				2,1%
Non noté	2,4%									0,4%
Total	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

*** les résultats SVE2 ne sont pas définitifs au 06/05/2011.**

Intitulés des domaines scientifiques

Sciences du Vivant et Environnement

- **SVE1 Biologie, santé**
  - **SVE1_LS1 Biologie moléculaire, Biologie structurale, Biochimie**
  - **SVE1_LS2 Génétique, Génomique, Bioinformatique, Biologie des systèmes**
  - **SVE1_LS3 Biologie cellulaire, Biologie du développement animal**
  - **SVE1_LS4 Physiologie, Physiopathologie, Endocrinologie**
  - **SVE1_LS5 Neurosciences**
  - **SVE1_LS6 Immunologie, Infectiologie**
  - **SVE1_LS7 Recherche clinique, Santé publique**
- **SVE2 Ecologie, environnement**
  - **SVE2_LS8 Evolution, Ecologie, Biologie de l'environnement**
  - **SVE2_LS9 Sciences et technologies du vivant, Biotechnologie**
  - **SVE2_LS3 Biologie cellulaire, Biologie du développement végétal**

UNIVERSITÉ DE LA MÉDITERRANÉE
AIX-MARSEILLE II

Objet : Réponse au rapport d'évaluation - **S2UR120001645 - Emergence des pathologies Virales - 0131843H** - de l'unité Emergence des pathologies Virales

Observations d'Aix-Marseille Université

Aucune observation n'est formulée

En accord avec les deux autres établissements d'Aix-Marseille

Le Président
de l'Université de la Méditerranée

Yvon BERLAND

Le Vice-président du Conseil Scientifique
de l'Université de la Méditerranée

Pierre CHIAPPETTA

Jardin du Pharo . 58 Boulevard Charles Livon . 13284 Marseille cedex 07 . France
Tél. : +33 (0)4 91 39 65 00 . Fax : +33 (0)4 91 31 31 36 . www.univmed.fr