Inhalopharmacologie expérimentale et clinique

Rapport Hcéres

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

Section des Unités de recherche

AERES report on the research unit

Inhalothérapeutique des accidents de décompression

From the

University of Caen Basse-Normandie

March 2011

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From the

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Le Président de l'AERES

Didier Houssin

Section des unités de recherche

Le Directeur

Pierre Glorieux

March 2011

Research Unit

Name of the research unit : Inhalothérapeutique des accidents de décompression

Requested label : UMR CNRS and Service de Santé des Armées

Name of the director : Mr. Jacques ABRAINI

Members of the review committee

Committee chairman:

Mr. Lucien BARTHELEMY, University of Brest, France

Committee members:

Mr. Yoram GROSSMAN, Ben-Gurion University of the Negev, Beer- Sheva, Israel

Mr. Daqing MA, Imperial College London, United Kingdom

Mr. Philippe DE DEURWAERDERE, University of Bordeaux, France

Observers

AERES scientific delegate :

Mr. Bruno BONTEMPI

University and research organization representatives:

Mr. Bernard BIOULAC, CNRS

Mr. Xavier BIGARD, French Armed Forces Health Services (IRBA)

Mr. Pierre DENISE, University of Caen (phone conference)

Report

1 • Introduction

This review reports the evaluation of the research unit "Inhalothérapeutique des accidents de décompression" by the visiting committee mandated by the AERES. A manuscript has been sent to all committee members including the AERES delegate (Dr Bruno BONTEMPI, Institut des Maladies Neurodégénératives, Bordeaux, France), the chairman (Prof. Lucien BARTHÉLEMY, Professeur Honoraire) and the three experts (Prof. Yoram GROSSMAN, Ben-Gurion University of the Negev, Israel; Dr Daqing MA, Imperial College London, London, United Kindom; and Dr Philippe DE DEURWAERDÈRE, University Victor Segalen, Bordeaux, France, also corresponding member of the national council of the Universities, Neurosciences Section). The manuscript included a research report for the period 2006-2010 for the two research teams at the origin of the project. The scientific project was presented in the second part of the document followed by the curriculum of the individuals participating to the project according to the guidelines of AERES. The manuscript was written in English (except administrative parts in French).

- Date and execution of the visit

The visit took place on March 1, 2011 at the «Institut de Médecine Navale du Service de Santé des Armées» in Toulon. Following a presentation by Dr. Jean-Jacques RISSO of the research policy of the French Armed Forces Health Service and relationships with national and international research efforts, the committee listened to a presentation by Prof. Jacques ABRAINI and Dr. Jean-Eric BLATTEAU which was organised into three main parts:

1) Project birth and 2006-2010 general report (publications, financial and academic data, etc.)

2) Scientific report for 2006-2010: inert gas and oxygen pharmacology and therapeutics (Prof. ABRAINI); prevention and mechanisms of decompression sickness (Dr BLATTEAU).

3) Research unit project for 2012-2015. The presentation was comprehensive and detailed. Prof. ABRAINI explained that the organization of the research unit for the project would be different from what noted in the manuscript. He said that due to the lack of tenure-track position at the University of Caen, Dr Hélène DAVID who is a key scientist for the preclinical research of the project has moved to Quebec where she has got a tenure-track position. Prof. ABRAINI, who has also obtained a renewable 3 years position of Adjunct Professor at Laval University (Quebec, Canada) as well as laboratory spaces, says therefore that the preclinical research of the project will not be performed in Caen but in Quebec in the Centre de Recherche, Université Laval Robert Giffard.

Therefore, the research unit will include three sites instead of two as thought initially. M. ABRAINI also clearly explained that establishing a joint research unit with CNRS and IRBA (UMR) to study the mechanisms of decompression sickness and discover innovative and efficient treatments requires establishing a "network-organized research unit" since the number of scientists required for establishing a joint research unit cannot be reached in one single place. The presentation of M. ABRAINI and M. BLATTEAU were followed by lively and interesting scientific discussions and excellent answers to many questions.

Separate meetings then allowed free discussions with researchers with permanent position as well as with engineers and technician assistants. Due to major organisational changes (new laboratory spaces and research facilities at Laval University and IRBA) the research unit has no longer PhD students. The Committee had also an exchange with the representatives of CNRS and University to which the candidate unit wishes to be affiliated (surgeon-general Bigard from the French Armed Forces Health Services; Prof. BIOULAC from the CNRS; Prof. Denise by phone from University of Caen). Finally, the committee discussed with Prof. ABRAINI and Dr BLATTEAU: to clarify specifically the management of the research unit.

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

The project was initiated by research scientists from the University of Caen and the CNRS (Equipe de Recherche Technologique, ERTi 1083, UMR CNRS 6232) and the French Armed Forces Biomedical Research Institute (IRBA). The unit in Caen is devoted to preclinical studies on the neuroprotective properties of inert gases (IG) and oxygen (O2) for treating brain insults involving excitotoxic insults and the mechanisms by which these agents act. The unit in Toulon (IRBA and Hyperbaric medical centre) is devoted the studies of the physiopathology and treatment of hyperbaric disorders, particularly decompression Sickness, and neuroprotection of brain injuries. Both had common programs on the neuroprotective effects and mechanisms of action of Inert Gases (IG) and Oxygen (O2) for treating brain injuries.

On the basis of their successful collaboration and a mission letter of the director of the French Armed Forces Biomedical Research Institute (Institut de Recherches Biomédicales des Armées; IRBA), these research groups have decided to merge in a single research unit « Inhalothérapeutique des accidents de décompression », which will be organised between Caen, Toulon, and Laval University (Quebec, QC, Canada) where Dr Hélène David has moved. To avoid possible difficulties due to the "network" structure of the research unit and to the fact that he is only part-time in Caen, Prof. ABRAINI proposes to have a deputy director both in Caen (Dr Nathalie COLLOC'H) and in Toulon (Dr Jean-Eric BLATTEAU) in order to facilitate the day-to-day management of the research unit.

- Management team

The head of the joint research unit "inhalothérapeutique des accidents de decompression is Prof. Jacques H. ABRAINI.

- Staff members

	ERT	IRBA	Future
N1: Number of researchers with teaching duties	1	0	1
N2: Number of full time researchers from research organizations and French armed forces health services	1	8	10
N3: Number of other researchers with no tenure-track position including postdoctoral fellows	2		
N4: Number of engineers, technicians and administrative staff with a tenured position	3 *	4	7
N5: Number engineers, technicians and administrative staff without a tenured position	1		
N6: Number of Ph.D. students	3	5	
N7: Number of staff members with a HDR or a similar grade	2	1	4

* These technicians were part-time of 30 to 80%.

2 • Overall appreciation of the research unit

- Summary

The aim of the Research Unit « Inhalothérapeutique des accidents de décompression » is the development of innovative and efficient therapeutic strategies for treating acute decompression sickness whose symptoms are mainly neurological (90% of cases). State-of-the-art therapeutic treatments including recompression and hyperbaric oxygen thought to be the gold standard for treating decompression sickness are not satisfactory since 30% of patients show incomplete recovery with moderate to heavy permanent neurological disorders.

The research goal will be the understanding of the effects of IG and O2 as neuroprotectants for treating decompression sickness that is well known to result from the generation of gas bubbles in the tissues and the blood. Bubbles in tissues can provoke mechanical effects but the most important cause of decompression sickness is due to intravascular bubbles that induce ischemia directly or indirectly through platelet aggregation and alterations of the endothelium coagulation system.

The rationale for the research program is excellent since (i) IG and O2 have proven their preclinical efficiency for treating ischemic/hypoxic insults; (ii) decompression sickness mainly results from intravascular bubbles that produce ischaemia by obstructing vessels directly and producing platelet accumulation and alterations of the coagulation system.

- Strengths

The project is based on a mission letter of the director of IRBA, the French Armed Forces Biomedical Research Institute.

Staff members all have several years of research experience in IG and O2 pharmacology and/or hyperbaric physiology and medicine.

Staff members of the research unit yet have proven their ability to produce high quality research publications on inert gas pharmacology and neuroprotection within the top 15%, while being in different research units, thereby demonstrating their synergistic association and efficiency.

The yet demonstrated synergistic association and efficiency between staff members should allow excellent research progress.

The research unit yet has access to major research facilities that include medical imaging facilities at CYCERON in Caen, biophysics and X-ray crystallography facilities at ESRF in Grenoble, hyperbaric facilities for large animals at IRBA in Brétigny-sur-orge, and hyperbaric chambers for experimental and clinical studies at the French Navy Experimental Diving Unit and military hospital Ste Anne in Toulon.

Ability to rise funding from national and foreign partners and institutions: US Army Medical Research and Material Command, NNOXe Pharmaceuticals, Direction Générale de l'Armement

The research unit is characterized by deep and close collaborations between expert groups and scientists with complementary approaches from structural to preclinical gas pharmacology studies.

- Opportunities

The position of Prof. ABRAINI as adjunct professor and head of laboratory at Laval University in Quebec could allow establishing official partnership between the University of Caen and Laval University (Prof. Denise, Vice-President of the University of Caen has acknowledged that Prof. ABRAINI can make his research activity in Laval University provided that he comes for doing his teaching duties in Caen in a narrow period of time of 1-2 months).

The position of Prof. ABRAINI as adjunct professor and head of laboratory at Laval University in Quebec will allow establishing partnership between the IRBA and the US Navy as desirable by the head office of the French Armed Forces Health Services. M. ABRAINI will receive a medical corp US Navy biomedical scientist, Dr Denis COLOMB, for three years according to an exchange/training program between the US Navy and Canadian Armed Forces with the agreement of the French Armed Forces Health Services.

Being adjunct professor at Laval University and head of laboratory and with the US Navy, Prof. ABRAINI will have the benefit of applying for grants of US and Canadian offices such as the Office of Naval Research, NAVSEA, and DARPA (USA) and the Canadian Ministry of Defence.

International collaborations: Laval University (Quebec, Canada); US Navy Experimental Diving Unit (Panama City USA).

The CNRS could join the project of this joint research unit with the French Armed Forces Health Services depending on AERES report.

- Weaknesses

The major weakness could be the distance between the staff members of the research unit on three different sites and the fact that Prof. ABRAINI will be part-time in Caen and part-time in Quebec at Laval University and Dr. COLLO'CH will be often in ESRF Grenoble.

However, it is noteworthy that staff members of the research unit yet have been working together successfully while being members of different research units.

The journal median ranking where inert gases - oxygen pharmacology and neuroprotection data hav been published is within the top 15% (with a median impact factor of 5.4). However, despite the fact that decompression studies have been published in high standard specialized journals such as *Journal of Applied Physiology; Undersea and Hyperbaric Medicine; etc.,* the research unit members still lack publications in top media such as *Science, Nature, Lancet, etc.*

- Threats

There is an important imbalance between the number of scientists with tenure position in Toulon (n=8) and that with tenure position in Caen (1 full time from the CNRS and 1 part-time from the university of Caen).

Depending on whether or not the CNRS will join the project, CNRS laboratory engineers and technicians (n=2) could not be available to be part of the project. Even if the CNRS joins the project, it should be noted that one laboratory engineer will retire next year.

Due to the distance between the sites that are part of the research unit, a scattering of research activities, coordination problems, and redundancies in research could be feared. However the goal of each research group is clearly defined while they are geared to perform complementary but different type of experiment.

Furthermore, all committee members have agreed that international research collaboration is the right way to go nowadays. Large funding bodies, including the European Commission, are now more and more looking for considerable size international research project.

Financial support seems secure from the French Armed Forces Health Services, and expected from the CNRS. The contribution of the University of Caen is still under discussion; decompression sickness is not a priority for that University.

- Recommendations

To avoid possible difficulties due to the organization of the research unit and to the fact that Prof. ABRAINI is part-time in Caen and part-time in Quebec, it is recommended as proposed by Prof. ABRAINI:

* to delegate deputy directory to Dr. Collo'ch and Dr. BLATTEAU.

* to strengthen the site of Caen, it is recommended (i) that the university of Caen should allocate to the project at least one tenure-track position for an academic researcher or at least research engineer in biophysics, (ii) that the CNRS should replace the laboratory engineer who will retire next year by a laboratory engineer with background in medical gas and hyperbaric research, particularly biophysics.

* to avoid a scattering of research activities, it is recommended as proposed by Prof. ABRAINI to schedule three general laboratory meetings per year under the direct supervision of Prof. ABRAINI in addition to those that will be supervised by the deputy directors in Caen and/or Toulon.

* to increase the research unit publication policy by enhancing the number of target journals from within top 15% to top 10%, including for studies on the mechanisms of decompression sickness.

- Production results

A1: Number of permanent researchers with teaching duties (recorded in N1) who are active in research	1
A2: Number of permanent researchers (CNRS, SSA-IRBA) without teaching duties (recorded in N2) who are active in research	8
A3: Ratio of members who are active in research among staff members [(A1 + A2)/(N1 + N2)]	90%
A4: Number of HDR granted during the past 4 years	2
A5: Number of PhD granted during the past 4 years	8

3 • Specific comments

- Appreciation on the results

Both research groups from Caen and Toulon have performed research that have led to new data and theories as regards to inert gas binding on proteins, inert gas pharmacology and neuroprotection (Caen) and the aetiology and mechanisms of decompression sickness and inert gas effects on neurotransmitters (Toulon). Collaboration between these two groups have led to publications in journals within the top 15% *(FASEB Journal, Critical Care Medicine, Journal of Cerebral Blood Flow and Metabolism, PNAS, etc.)*.

- Major findings and discoveries during the past 5 years include:

Accessibility and hydrophobicity are the major criteria for IG binding in proteins' hydrophobic pockets as shown by structural biophysics and crystallography studies.

Xenon and nitrous oxide offer global neuroprotection by improving histologic and neurologic outcomes through blockade of NMDA receptors and excitotoxic processes in a rat model of mechanical acute stroke.

Xenon is a tPA inhibitor and as such inhibits tPA-induced thrombolysis and tPA-induced proteolytic adverse effects in a rat model of thrombo-embolic stroke. This indicates that xenon should be used to provide neuroprotection only once reperfusion has occurred.

Nitrous oxide is a tPA inhibitor and inhibits tPA-induced thrombolysis but favors tPA-induced adverse effects. This provides a definitive advantage to xenon compared to nitrous oxide.

Helium produces global neuroprotection by improving histologic and neurologic outcomes in a rat model of mechanical acute stroke due to its high specific heat that is 5-fold that of air. Combining xenon and helium could be beneficial since hypothermia has synergistic effect with xenon.

Intra-ischemic 100% normobaric oxygen (NBO) possesses in vivo thrombotic action by increasing tPA enzymatic activity. But, in contrast, post-ischemic NBO increases brain damage and swelling. This indicates that NBO should be used before but not after reperfusion.

Hyperbaric narcotic gases induce a decrease in the release of many neuromediators such as glutamate and dopamine. TREK-1 channels may play a role in inert gas action.

Aetiology, prevention and treatment of spinal cord decompression sickness: symptom latency after surfacing; time intervals between symptom onset and hyperbaric treatment.

Aetiology, prevention and treatment of spinal cord decompression sickness: role of right-to-left shunts (patent foramen ovale); preconditioning methods to decrease of bubble generation.

Aetiology, prevention and treatment of spinal cord decompression sickness: persistence or worsening symptoms after recompression; clinical and imaging (MRI) data.

Development of a clinically relevant model of decompression sickness in the rat: mechanisms of decompression sickness; endothelial immuno-inflamatory processes; platelet accumulation to the gas bubble surface; gas bubble-induced ischemia and thrombin production.

Development of a clinically relevant model of decompression sickness in the rat: preclinical studies with several compounds acting on platelets accumulation.

- Publications 2006-2010

Total number of publications (ISI web of knowledge or Pubmed): 68 + 6 in review process

Number of publications on inert gases and oxygen: 20 + 4 in review process

Number of publications on decompression sickness: 31 + 2 in review process

Number of invitations to conferences and lectures: 19

Number of chapters in scientific books: 6

Number of PhD thesis: 3

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

Development of a clinically relevant model of decompression sickness in the rat: preclinical studies preclinical studies with several compounds acting on platelets accumulation.

Research unit members had attracted external funds from the Direction Générale de l'Armement, the NNOXe Pharmaceuticals, the US Army Medical Research and Materiel Command, etc.

Research data leading to 5 patents and patent applications.

Research projects included international collaborations with the US Army Medical Research and Materiel Command; the University La Sapienza (Roma); NNOXe Pharmaceuticals, and foreign hyperbaric medical centres.

Research unit members are well-recognized scientists in the field of inert gas pharmacology and/or hyperbaric medicine and physiology. This includes:

- Choice of Prof. ABRAINI for mentorship of Dr Colomb by the US Navy medical corp.
- 19 invited lectures and conferences;
- 11 awards and prizes, both national and international (Soriano prize of the French national academy of medicine; Zetterström memorial medal of the Swedish defence research centre; Zetterström award of the European Baromedical Society; Silver medal for scientific work of the French Armed Forces Health Services, etc.);
- Membership of editorial boards in medical gas, anaesthesiology, and pharmacology journals.
- Participation to international or national scientific survey networks: Divers Alert Network, European Committee for Hyperbaric Medicine; North Atlantic Treaty Organisation.

- Appreciation of the management and life of the research unit

Research scientists, technicians and past PhD students have had the opportunity to participate to national and/or international scientific meetings.

Research scientists are involved in teaching activities in master and doctoral curricula in Caen, Marseille, Lyon, and Toulon, as well as in continuous education programs and civil and defence postgraduate programs.

All staff members, including researchers, technicians, and past students, have benefited training sessions on the use of medical gases.

Technicians have had the opportunity to sign scientific papers.

Day-to-day management should be similar in the joint research unit project « Inhalothérapeutique des accidents de décompression », but scientific directory could be quite difficult since Prof. ABRAINI is part-time in Caen and part-time in Quebec City. Delegation to deputy directors as proposed by Prof ABRAINI will be appropriate to manage day-to-day the research unit programs. All members of the research unit board (Prof. ABRAINI, Drs BLATTEAU and COLLOC'H as deputy directors, and Dr RISSO as the representative of the director of IRBA) want to keep the way of passed functioning that has allowed producing high quality publications in combination with general laboratory meetings that will be held 2 times a year in Caen and Toulon, as well as in Quebec City (board members only).

- Appreciation on the scientific strategies and project

The translational research project « Inhalothérapeutique of Decompression Sickness » is largely relevant. The research project will focus mainly on the understanding of the effects of IG and O2 as neuroprotective agents for treating decompression sickness, which is well known to result from the generation of gas bubbles in the tissues and the blood.

The rationale for the research program is good since (i) IG and O2 have proven their preclinical efficiency for treating ischemic/hypoxic insults; (ii) decompression sickness is thought to result mainly from intravascular bubbles that produce ischaemia by obstructing vessels directly and through platelet and thrombin accumulation. Unpublished preliminary studies have proven that decompression sickness has an excitotoxic component.

The IG effects for treating decompression sickness yet has not been studied although positive results would constitute a decisive advance since (i) IG could have neuroprotective action without adverse effects; (ii) gold standard therapeutic strategies including recompression, hyperbaric oxygen, and drug treatments interacting with coagulation and inflammation have remained unsatisfactory because 30% of patients show incomplete recovery with moderate to heavy permanent neurological disorders.

The feasibility of this translational research project seems secure. Both similar basic and preclinical investigations have been performed previously with success by Prof. Abraini, Dr Colloc'h and Dr Risso. The mechanisms of neurological decompression sickness remains largely to be specified but preliminary experiments yet have proven the involvement of excitotoxic processes. Initiating clinical studies will depend on preclinical results, but could be performed since the staff members of the diving and hyperbaric medical unit of the military hospital Ste Anne are part of the project.

The rationale and steps of the research project are very clearly and logically stated from basic and preclinical studies to clinical trials based on the research unit's previous findings on the mechanisms of action, gas binding mode on proteins, mechanisms of decompression sickness, and neuroprotective and adverse effects of IG and O2 in a thrombo-embolic acute ischemic stroke model.

Main research goals are:

- To study the binding of IG on enzymes relevant to ischemia and neuroprotection and to oxygen transporter proteins, gas-globin complexes such as myoglobin and neuroglobin.
- To determine the possible and respective role and contribution of apoptosis and necrosis in neurological decompression sickness.
- To determine the role of TREK-1 channels, which have been demonstrated to modulate IG effects, in neurological decompression sickness.
- To perform preclinical studies to determine IG effects when given after hyperbaric oxygen, IG effects when given alone, IG effects when given after normobaric oxygen, IG effects when given alone or in combination with oxygen under hyperbaric conditions, as compared to hyperbaric oxygen that is thought gold standard treatment today.
- To perform preclinical studies with combination of IG and/or O2 as above with others therapeutic strategies such as EPO.

- Depending on preclinical findings, to perform human experimental studies and clinical trials. This could include: (i) experimental studies on safety and calculation of decompression procedure while breathing IG at hyperbaric pressure; (ii) clinical trials with IG alone, in combination or sequentially with oxygen for treating neurological decompression sickness as compared to state-of-the art gold standard practice with hyperbaric oxygen alone.
- Depending on the way IG will be used, this could be a hard step to perform as it could combine clinical practice, statistical trials, decompression safety, and technical aspects due to pressure. However hyperbaric clinicians from the diving and hyperbaric medical unit in military hospital Ste Anne are experts in the field.

4 • Conclusion

The competency and experience of the research scientists involved in the project is widely and internationally recognized. Possible weakness due to the distance between the research unit sites should be resolved by the presence of deputy directors as proposed by the research unit director.

The number of publications and patents is at the top and even impressive for the field of inert gases and oxygen pharmacology and neuroprotection, and decompression sickness.

The Research in neuroprotection afforded by noble gases made by this laboratory is leading the field worldwide.

This project is a golden opportunity to become a leading figure in military and civilian diving research; the use of inert gases for treating the decompression sickness is innovative and promising pathway.

Intitulé UR / équipe	C1	C2	C3	C4	Note globale
INHALOPHARMACOLOGIE EXPERIMENTALE ET CLINIQUE	A	A	C	A	B

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 Caen
Basse-Normandie

Caen, le 21 avril 2011

La Présidente de l'Université de Caen Basse-Normandie

à

Monsieur le Directeur
Section des Unités de Recherche
AERES

V/Réf. : Evaluation - S2UR120001218 - « INHALOTHERAPEUTIQUE DES ACCIDENTS DE DECOMPRESSION - 0141408E

Dr Jacques H. Abraini, director of the research unit project « inhalothérapeutique des accidents de décompression » and Dr Jean-Jacques Risso, the representative of the director of the Institut de Recherche Biomédicale des Armées (IRBA) agree with the general comments of the AERES report and, particularly the fact that the research program of the research unit project is a preclinical and clinical (depending on the preclinical results that will be obtained), rather than a basic, research program.

UCBN also agrees with the general comments, but considers that the complex position of Dr Abraini, professor at the Caen University, has to be clarified.
Prof. Abraini now indicates a position of adjunct professor and head of laboratory at Laval University in Quebec.

Consequently an official partnership between the University of Caen and the Laval University seems required before starting this project.

La Présidente de l'Université
de Caen Basse-Normandie,

Josette TRAVERT