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

Research Units Department

AERES report on unit:

Diabète et thérapie cellulaire
DIATHEC

Under the supervision of the following institutions and research bodies:

Université de Strasbourg
Centre Européen d'Etude du Diabète

January 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

Unit

Name of unit:	Diabète et thérapie cellulaire
Acronym of unit:	DIATHEC
Label requested:	UMR Université-Entreprise
Present no.:	
Name of Director (2009-2012):	Ms Séverine SIGRIST
Name of project leader (2013-2017):	Ms Séverine SIGRIST

Members of the committee of experts

Chair:	Mr Philippe HALBAN, Genève, Suisse
Experts:	Mr François PATTOU, Lille
	Mr Philippe RAVASSARD, Paris
	Mr Jean-Louis WEMEAU, Lille (representative of CNU)

Representatives present during the visit

Scientific Delegate representing AERES:

Mr Jean GIRARD

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

Mr WESTHOF, University of Strasbourg

Report

1 • Introduction

Date and conduct of visit:

The visit took place on January 13, 2012 at the CEED, Boulevard René Leriche, Strasbourg. The programme and the schedule were prepared in agreement with the president of the site visit committee and were fully respected in terms of discussion time and specific meetings with the members of the future « UMR Université-Entreprise ». The experts also met the students and technicians and the representatives of the different local Institutions who gave all necessary details to answer their questions.

History and geographical location of the unit, and overall description of its field and activities:

The CEED is a private entity created in 1991 with a major focus on clinical diabetology and diabetes research. The current major research projects of the Centre are focused on cell therapy, oxidative stress and drug delivery devices under the general scientific leadership of Séverine SIGRIST. The Centre is recognized for its studies on islet biology and specifically islet transplantation. Financial support for research comes from the for-profit activities of the Centre, notably in regional healthcare delivery, as well as major funding from the European Commission. A company created by the unit director s developing a macroencapsulation device for insulin delivery offering useful potential for collaborative research with the Centre.

Diabetes is one of the major health challenges of the 21st century, with over 300 million people affected worldwide. While less than 10% of diabetics suffer from type 1 diabetes, they are dependent upon exogenous insulin therapy for survival and even optimalised insulin therapy cannot offer a cure; all patients are likely to develop serious micro- and macrovascular diabetic complications as well as hypoglycaemic episodes that together compromise both quality of life and life expectancy. Islet transplantation offers the possibility of a cure, but despite the early promise of new immunosuppressive regimens and improved islet isolation techniques, insulin independence is typically less than 5 years. Research at the CEED is focused on improving islet survival both before and immediately following implantation, as well as exploring alternative sites for implantation. This translational research platform is thus well justified from the clinical point of view.

The University of Strasbourg is a recognized centre of excellence in biomedical research. Closer collaboration between the translational research focus of the CEED and the international leaders in basic research at the University, notably in developmental biology, should be of great benefit to both organisations.

Management team: Ms Séverine SIGRIST

Unit workforce:

Workforce	**Number** on 06/30/2011	**Number** on 01/01/2013	2013-2017 **Number of producers****
N1: Professors or assistant professors	6	8	5
N2: EPST or EPIC researchers			
N3: Other professors and researchers	2	5	5
N4: Engineers, technicians and administrative staff ***on a permanent position	1	1	
N5: Engineers, technicians and administrative staff * on a non-permanent position	4		
N6: Postdoctoral students having spent at least 12 months in the unit	1		
N7: Doctoral students	4		
N8: PhD defended	5		
N9: Number of Habilitations to Direct Research (HDR) defended	1		
N10: People habilitated to direct research or similar	3		
TOTAL N1 to N7	**18**	**14**	**10**

* **If** different, indicate corresponding FTEs in brackets.

** Number of producers in the 2008-2011 period who will be present in 2013-2017.
Definition and downloading of criteria:
http://www.aeres-evaluation.fr/Evaluation/Evaluation-des-unites-de-recherche/Principes-d-evaluation.

2 • Assessment of the unit

Overall opinion on the unit:

The visiting committee considered the scientific focus on improving islet survival in transplantation to be highly relevant and well suited to this team. The three major subprojects are well integrated into the overall scientific strategy of the Centre, even if it would have been important to show closer synergy between the proposed research and ongoing development of an implantable device for cell-based therapy. The proposed cooperation between a for-profit entity/association and a university was considered original and of potential value to the region.

Overall enthusiasm for the research proposal was decreased by a general lack of scientific innovation. Although it is appropriate for the Centre to focus more on technological rather than theoretical aspects of the problems to be addressed, the result is a rather observational approach to the specific thematic areas; it will be most important to focus on fewer objectives to be studied in greater depth in order to gain insight into underlying molecular pathways. This will in turn lead to greater productivity and visibility.

The experts were impressed by the support to be offered by the University of Strasbourg and by the general enthusiasm of the younger scientists at the Centre who were obviously well cared for, resulting in an excellent team spirit. There was however major concern regarding lack of productivity over the past 5 years and the urgent need to recruit one or more senior scientists to coordinate research, given the very heavy administrative work of the unit director. It will be most important to ensure yet closer cooperation between researchers at the Centre and clinical diabetologists, and to endeavour to build up capacity for isolating human islets for research and ultimately to expand the local islet transplantation operation in order to complete the translational track of the proposed research.

Strengths and opportunities:

The major scientific focus on improving islet survival before and after implantation is of major importance to the future clinical success of islet transplantation, with important implications for any other future cell-based therapy for diabetes. Improving survival of human islets during the isolation procedure will be essential to increase the number of islets available for transplantation. It is also recognized that there is considerable loss of islets during the period immediately after implantation, offering a unique window of opportunity for intervention to protect the graft against this acute inflammatory response. Oxidative stress has long been seen as a major pathway for beta cell destruction, providing ample justification for this particular focus. Improving vascularisation of islet grafts is also a most important area of research, even if quite ambitious. If successful, the three subprojects should contribute towards improved success and efficacy of clinical islet transplantation while possible offering new techniques for protecting surrogate beta cells in future cell-based therapy for diabetes. The following specific strengths were indicated by the members of the visiting committee:

- Clear technological focus.
- Existing expertise in islet isolation and transplantation models.
- Experience in studying oxidative stress and early development of protective molecules.
- Strong track-record in technology transfer, patents and creation of a start-up company.

Weaknesses and risks:

There is a general lack of innovation in all of the proposed projects with the real risk that the Centre will not be competitive in this crowded research space. The projects will need to be much more focused, with more effort to characterize underlying molecular events: as presented, the proposed studies are quite superficial with the real risk of not being competitive for external funding and publication of results in leading journals. While the team has recently been strengthened by new academic collaborators, the CEED leadership recognizes the urgent need to recruit new senior scientists to the team. Such consolidation will be essential to improve scientific productivity with publication of significantly more papers in leading journals, and for the Centre to be considered in the medium to long term as an international centre of excellence. The following specific weaknesses were indicated by the members of the visiting committee:

- Scientific focus too broad to allow for an innovative outcome.
- Clinical endpoints of the proposed translational research not clear, with no real evidence for collaboration with ongoing local research efforts in clinical islet transplantation.

- Inadequate synergy between proposed research and devices under development by the associated for-profit enterprise.
- No clear strategy to study alternative approaches to islet transplantation beyond intrahepatic implantation of allogeneic islets
- Inappropriate choice of islet species or transplantation models for some subprojects.
- No existing external scientific advisory board

Recommendations:

The visiting committee recommends that a new senior scientist be recruited, possibly through the creation of a University Chair if this mixed Unit is approved. It was most encouraging to learn from the Dean of the Faculty of Medicine and the Vice-Rectors of the University responsible for research and business development that they understood the needs of the Centre and would be prepared to invest accordingly in order to ensure success in the medium term. The visiting committee further recommends the creation of an External Scientific Advisory Board to help the Centre formulate its scientific strategy and to oversee scientific progress.

The visiting committee further recommends a clearer scientific focus on a more limited number of topics under each subproject, allowing for in-depth mechanistic studies and avoiding the risk of the proposed research being too observational to allow for effective translation to the clinics.

3 • Detailed assessments

Assessment of scientific quality and production:

The Centre's research activities continue in the tradition of this group of investigators with experience in technology development in a translational research context. The creation of a mixed unit, combining these strengths with the academic excellence of the University of Strasbourg is of potential interest to the region, with a focus on islet transplantation and more generally type 1 diabetes therapy.

The bibliography in the project proposal for the period 2007-2011 lists 32 publications (with a further 6 submitted for publication but not considered here) that have been published or are in press, indicating quite modest basic research activity both in terms of quantity and quality (impact factor: IF). The publications can be broken down and analysed as follows:-

- 21 papers out of the 32 listed, are devoted to clinical studies. Of these, 71% have an IF>3.
- The remaining 11 papers are devoted to basic research themes directly relevant to the present proposal. Of the, only 27% have an IF>3; 55% IF<1.

The Centre has been quite successful in developing new technology with possible clinical applications, and this has led to the creation of a start-up company DEFYMED for development of a bioartificial pancreas. Perhaps because of this technological focus and the time/energy invested in creating this company and other for-profit activities of the Centre, scientific productivity measured by publications has been disappointing, with just 32 papers, the vast majority in relatively low-impact journals. The recruitment of a new junior scientist is most welcome, but the other scientists appear to have been trained at the Centre, albeit with postdoctoral training abroad in one case. There is an urgent need to recruit "new blood", especially at the group leader level, to ensure that there is more scientific oversight of the various projects than Ms. SIGRIST can provide given her administrative duties as scientific director of the Centre and her strong involvement in the start-up she created (duties she carries out to great effect, it must be stressed). Closer collaboration with the University will be most important for attracting new young talent including Masters and doctoral students.

Assessment of the unit's integration into its environment:

The Centre has been very active in technology development, leading to several patents and the creation of DEFYMED. Ms. Sigrist has received support from the European Commission Framework Programmes as well as the National Ministry of Research. Her company has received strong support from the regional government as well as an "Emergence" prize from the National government in 2011. There has also been support from the pharmaceutical industry (Novo Nordisk) but currently the main income stream is from the Centre's commercial clinical arm, ASDIA. Although taken together such support is impressive and indicates that the Centre is considered competitive and of regional and national interest, the visiting committee was greatly concerned that the specific projects described in the written proposal and presented during the site visit have not been supported by external competitive funding.

Assessment of the research unit's reputation and drawing power:

Aside from having coordinated the European Commission FP6 project BARP+, and a possible involvement in a new FP7 project, the unit is not particularly visible from an international academic viewpoint. None of the members of the group have received any prize or other major distinction in the past 5 years. While there has been a useful collaboration with the University of Oxford, with a young investigator who had first trained in the Centre working at the Oxford Centre for Diabetes, Endocrinology and Metabolism as a postdoctoral Fellow and now returning to Strasbourg, there is no convincing evidence of strong collaboration with any other major academic team, in France or any other country, even if such collaborations are mentioned briefly in the proposal. The international standing and visibility of the group must thus be considered limited. There has been little effort to recruit new scientists not previously trained at the Centre, making it somewhat inbred.

Assessment of the unit's governance and life:

Ms. SIGRIST is responsible for both the administrative and scientific affairs of the Centre. She is a well-liked and well-respected leader, and the experts' discussions with various junior members of the group during the site visit indicated that she is personally involved as a mentor in their scientific training and research projects. The general atmosphere in the Centre appeared to be exceptionally friendly and dynamic; Ms. SIGRIST is largely responsible for this

very positive state of affairs. She must also be given credit for creating a start-up company and for attracting funding from the Commission, the French government and regional agencies. But there is only so much one person can do alone, and the experts recommend that a new senior scientist be recruited, possibly through the creation of a University Chair if this mixed Unit is approved. It was most encouraging to learn from the Dean of the Faculty of Medicine and the Vice-Rectors of the University responsible for research and business development that they understood the needs of the Centre and would be prepared to invest accordingly in order to ensure success in the medium term. The members of the visiting committee further recommend the creation of an External Scientific Advisory Board to help the Centre formulate its scientific strategy and to oversee scientific progress.

Assessment of the strategy and 5-year project:

There are three major subprojects, each focusing on a different aspect of islet survival before or after implantation.

A. Improve survival of islets during isolation and culture

The team wishes to limit damage to islets caused by hypoxia and oxidative stress during the isolation procedure. The majority of these studies will be performed using porcine pancreas but supply of this starting material and subsequent transfer of technology to the human pancreas (that requires quite different digestion procedures) is not documented in the proposal. Most of the proposed studies are rather superficial and essentially observational, and some of the specific protocols require greater thought. For example, analyzing RNA taken from the digesting tissue cannot indicate what is happening only within islets, representing approx 1% of total tissue at this stage before islet purification. This would have been better achieved using morphological methods.

A second part of this subproject focused on generation of reactive oxygen species (ROS) during culture of islets before transplantation. This is suggested to be triggered by hypoxia during isolation of islets. The team will extend their ongoing studies on perfluorocarbon emulsions (PFC) to reduce such hypoxia. This is an original approach that the group has developed over the past few years in collaboration with the University of Oxford and the committee was pleased to see this continued. The proposed studies *in vivo*, using 3D gel supports combined with PFC to improve oxygenation after implantation are especially interesting. However, the use of rat islets for this study is inappropriate and it will be challenging to translate the findings to human islets that are so different in structure, cellular composition and beta cell sensitivity to ROS. It would also have been pertinent to collaborate with the partner start-up company that has great experience with cellular supports for implantation.

B. Prevent acute inflammatory response immediately following implantation and oxidative stress due to the diabetic environment.

This group has shown previously that the purity of islet preparations influences strongly the local acute inflammatory response after implantation. They now propose to study this in greater detail using syngeneic rat islet implantation in the liver. Again, the experiments will be essentially descriptive. The proteomic analysis of liver during the first 24h after implantation is hard to understand. How will these investigators be able to limit their analyses to the region immediately surrounding the islets, where the inflammatory response will arise? These *in vivo* studies will be complemented by co-culture of Kupfer cells/neutrophiles with islets, with a particular focus on TLR signaling and other major pathways leading to beta cell death. They will also test the possible anti-inflammatory effects of GLP-1. Although potentially interesting, the experiments were not described in sufficient detail in the written proposal or the presentation during the site visit to allow the committee to evaluate their validity or feasibility. This is a particularly competitive area of research and the group is encouraged to focus more on understanding the detailed molecular events rather than simply documenting changes.

Previous studies from this group have indicated that in insulin-deficient rats, exogenous insulin decreases arterial ROS only when delivered intraperitoneally (IP) but not subcutaneously, leading to the hypothesis that portal insulinisation may be beneficial to islets following hepatic implantation. It is further suggested that the interplay between the diabetic environment and the site selected for islet engraftment may be critical for islet survival and notably for the degree of oxidative stress to which they will be exposed. However, these studies will focus on hepatic implantation only. Transplanted rats will be treated by exogenous insulin administered either IP or using proprietary nanoparticles for oral administration. Several parameters will then be measured including IGF-1, hepatic glycogen and both the survival and function of the transplanted islets. While the documented hepatotoxic effects of local hyper-insulinisation that drives steatosis surrounding implanted islets is mentioned, it was hard to understand how increasing portal insulin would benefit islets implanted in the liver, and the cross-talk between portal and local (peri-islet) insulinisation.

While it is indicated in the proposal that other implantation sites will be evaluated, no great detail is provided. It is simply mentioned that the group will exploit the bioartificial pancreas developed in the laboratory and now taken on by their start-up company. The device will be implanted in the omentum but no further details are provided of the proposed studies. This is most unfortunate since the members of the committee felt it most important to foster greater collaboration between the Centre and this company.

C. Improved revascularisation after implantation.

It is well established that it takes up to 2 weeks for implanted islets to become revascularised to a sufficient extent to ensure their function and survival. It follows that efforts to accelerate this process may lead to improved clinical outcomes. This group has shown previously that VEGF is a critical factor in this process and that small molecules such as deferoxamine that stimulate VEGF production can have a favourable impact. However, such molecules have too short a half-life to be useful. The first part of the proposed studies will be performed *in vitro* in order to follow the expression of genes involved in revascularisation in a mixed culture system. Although very little detail is provided, it is understood that the group will use a combined unbiased and candidate approach to identify key genes that may be implicated in islet vascularisation. Two important questions are posed: 1. Is the islet able to generate its own vascular bed? 2. Is the host environment important for islet vascularisation. To answer these questions, the in vitro experiments will be complemented by in vivo studies, using an implantation model into the caudate lobe of the liver of healthy or diabetic rats. This site facilitates analysis of the engrafted tissue. The group does not seem to be familiar with the literature (here or elsewhere) since the contribution of donor (islet) vs. host (site of implantation) endothelial cells towards islet revascularisation has been very well studied by several groups, including most notably at Vanderbilt University. There are also experimental systems allowing for direct observation of implanted islets in real time.

It is further hypothesized that hepatic implantation of islets induces local production of factors including HGF that may in turn stimulated VEGF production. This is an attractive hypothesis that merits further investigation and that could offer an innovative research arm to the Centre. However, this subproject although certainly creative and original, would benefit greatly from a more carefully developed experimental approach. For example, there is the need for a better-validated *in vitro* model of islet revascularisation, with possible co-culture with the relevant liver cell types. It will be critical to use human islets and cells for this purpose. The proposed *in vivo* studies will be particularly hard to interpret, especially the experiments using exogenous factors: how will the investigators distinguish between direct and indirect effects (i.e. secondary to metabolic changes)?

This is a very crowded research space and the Centre must find a specific niche to exploit their expertise while focusing on particularly novel aspects of this conundrum.

Assessment of the unit's involvement in training:

The Centre has successfully trained a number of Masters and doctoral students, and continues to do so today. The creation of a mixed Unit with the University will certainly open up the possibility of training more students and for the faculty to be more involved in teaching. This would be a "win-win" situation; the Centre has excellent facilities and offers a potentially strong training environment, especially if new groups are created following recruitment of new group leaders/senior scientists.

4 • Grading

Once the visits for the 2011-2012 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 four criteria defined by the AERES and was given along with an overall assessment.

With respect to this score, the research unit concerned by this report (and, when necessary, its in-house teams) received the overall assessment and the following grades:

Overall assessment of the unit [Diabète et thérapie cellulaire]:

Unité dont la production et le projet sont bons, mais pourraient être améliorés. Le rayonnement, l'organisation et l'animation sont très bons.

Grading table:

C1 Scientific quality and production.	C2 Reputation and drawing power, integration into the environment.	C3 Laboratory life and governance.	C4 Strategy and scientific project.
B	**A**	**A**	**B**

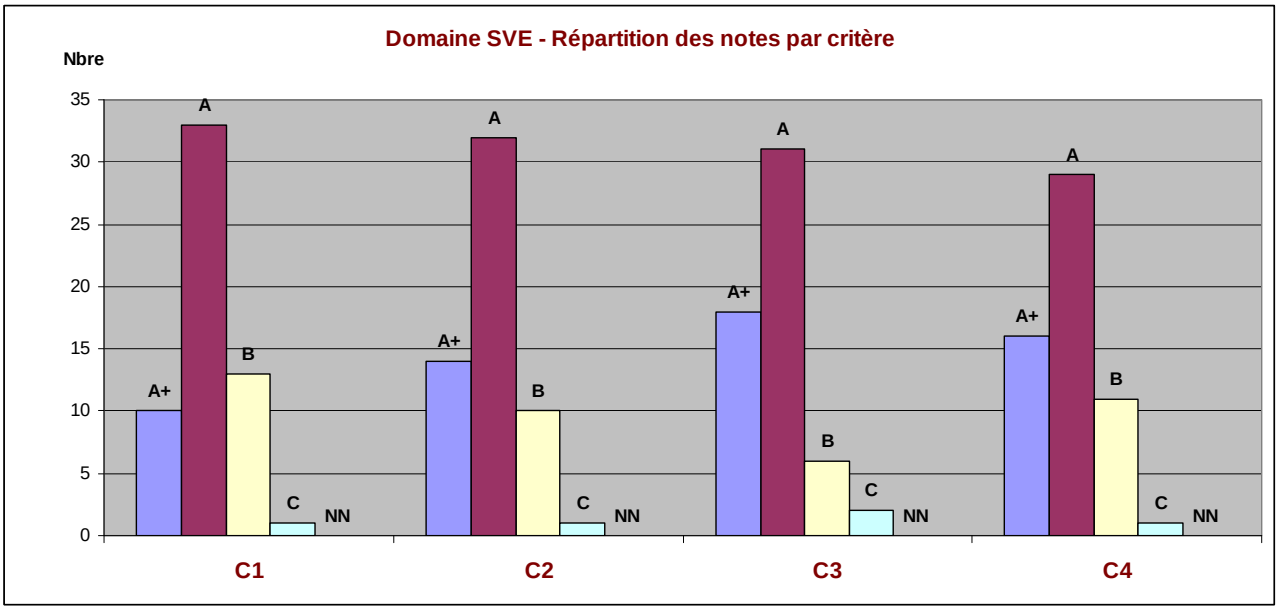
5 • Statistics per field: SVE au 10/05/2012

Notes

Critères	C1	C2	C3	C4
	Scientific quality and production	Reputation and drawing power, integration into the environment	Laboratory life and governance	Strategy and scientific project
A+	10	14	18	16
A	33	32	31	29
B	13	10	6	11
C	1	1	2	1
Non noté	-	-	-	-

Pourcentages

Critères	C1	C2	C3	C4
	Scientific quality and production	Reputation and drawing power, integration into the environment	Laboratory life and governance	Strategy and scientific project
A+	18%	25%	32%	28%
A	58%	56%	54%	51%
B	23%	18%	11%	19%
C	2%	2%	4%	2%
Non noté	-	-	-	-



6 • Supervising bodies' general comments

UNIVERSITÉ DE STRASBOURG

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Agence d'évaluation de la recherche et de
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Alain BERETZ
Président

Strasbourg, le 11 avril 2012

Objet : Rapport d'évaluation du projet d'UMR «Diabète et thérapie cellulaire » (réf. S2PUR130004563-RT)
Réf. : AB/EW/N° 2012-175

Affaire suivie par
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Direction de la recherche

Cher collègue,

Je vous remercie pour l'évaluation du projet d'unité mixte de recherche Université / entreprise « Diabète et thérapie cellulaire» porté par Madame Séverine Sigrist.

Vous trouverez ci-joint les réponses du porteur de projet concernant les erreurs factuelles et les remarques et appréciations du comité d'experts.

La création de cette unité de recherche participe de l'effort de l'université envers la médecine translationnelle. Une réflexion sera menée, en concertation avec la directrice de l'unité, pour l'aider dans ses démarches afin de suivre les recommandations émises par le comité de visite.

Je vous prie d'agréer, Cher Collègue, l'expression de mes sentiments distingués.

Alain BERETZ

P.J. :

- **Une première partie corrigeant les erreurs factuelles**
- **Une seconde partie comprenant les observations de portée générale**

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2 - **Observations de portée générale**

Le comité d'évaluation suggère de concentrer les études par une caractérisation des voies moléculaires. C'est cependant l'objectif même des différents projets présentés, tant au niveau de l'isolement de la culture et de l'implantation des îlots pancréatiques. Des publications, actuellement soumises notamment sur l'aspect inflammation et site receveur ont été exclusivement dédié à l'étude de ces mécanismes.

L'aspect translationnel (médecine/recherche) de l'équipe n'est pas apparu clairement lors de l'évaluation. En effet, aucune présentation n'a été faite pour présenter cette recherche translationnelle. Cependant, la recherche clinique et fondamentale est étroitement imbriquée dans l'équipe avec notamment le démarrage en 2012 d'un PHRC inter régional sur le diabète gestationnel et le stress oxydant avec le Professeur Nathalie Jeandidier. De plus, la thématique de l'insulino-thérapie par voie intrapéritonéale provient de la recherche clinique et des nombreuses études réalisées dans le service de diabétologie du Professeur Pinget sur la pompe externe. Le docteur François Moreau est également impliqué dans la recherche fondamentale. Il a soutenu en 2011 sa thèse de sciences après 5 années de recherche au sein du CeeD et continue son activité de recherche par le développement d'une thématique propre sur l'étude site alternatif pour la transplantation des îlots pancréatiques.

Le comité a suggéré d'apporter plus de lisibilité sur la collaboration et les projets de recherche en développement entre le CeeD et la Start-up Defymed créée au sein du laboratoire. Il était difficile au moment de l'évaluation de présenter ce projet de recherche qui était en cours de rédaction avec des partenaires internationaux (notamment le Nuffield institute de OXFORD et l'université Catholique de Louvain reconnu pour leurs compétences dans l'isolement et la transplantation d'îlots pancréatiques). Un projet européen a été déposé, coordonné par le CeeD avec pour objectif d'améliorer la viabilité des îlots pancréatiques au sein du pancréas bioartificiel. Ce projet intitulé BIOSID a passé la première phase d'évaluation. Nous attendons aujourd'hui la réponse finale.

Le comité suggère de revoir le choix des espèces et des modèles utilisés. Nous mettons en place cette année un nouveau laboratoire d'isolement d'îlots humains à visée scientifique. Lors de l'évaluation, nous n'avions pas une lisibilité satisfaisante sur la possibilité de se procurer les pancréas humains pour cette étude. C'est chose faire aujourd'hui : ainsi, toutes les études réalisées sur la partie isolement et culture d'îlots pancréatiques seront réalisées sur les îlots humains ou sur les îlots de porc dont l'isolement se rapproche le plus à l'humain. L'année 2012 sera entièrement consacrée à cette mise en place. Quant aux modèles de transplantation, nous avons entendu les craintes du comité concernant les modèles proposés. Ainsi, d'autres modèles plus adaptés sont à l'étude notamment pour la partie implantation. La mise en place de l'isolement d'îlots humains permettra également de réaliser nos étude sur ces îlots dans un modèle de souris NUDE.

Le comité a noté l'absence de conseil scientifique. Le directeur de l'unité s'est engagé à créer ce conseil scientifique dans les plus brefs délais. Un certains nombres d'experts dans le domaine du diabète et de la transplantation ont été contacté et ont répondu présent. Le premier conseil scientifique devrait être organisé en octobre 2012.

Le comité a émis des remarques sur l'insuffisante productivité scientifique du laboratoire au cours des 5 dernières années. Il est a noté que le laboratoire a considérablement évolué au cours des 5 dernières années avec la mise en place de nouveaux projets. La soumission d'articles pour certains projets comme l'insuline orale ou le pancréas bioartificiel est empêchée par le dépôt de brevet. Dans le cas de l'insuline orale, cette situation est maintenant débloquée et 3 articles sont en cours de soumission. Dans le cas du pancréas bioartificiel, le démarrage du programme européen devrait permettre de trouver « d'autres niches » de publications. L'objectif fixé par le laboratoire dans les 5 années à venir est d'augmenter considérablement cette productivité avec un cahier des charges clair en termes de publication et de facteur d'impact. Le renforcement de la recherche translationnelle devrait également permettre de publier des données fondamentales sur des études cliniques.

Concernant les subventions obtenues par le CeeD, elles sont à la fois régionale (région Alsace, CG, CUS, OSEO), nationale (FUI) mais également européenne (2 projets européens financés avec des équipes de renommées internationales en Italie, Belgique, Allemagne…)

Des demandes de subvention sont en cours concernant le projet présenté lors de la visite : fondation transplantation, 7ème PCRD, avenir… L'équipe est aujourd'hui visible à l'international avec la participation à de nombreux congrès et l'invitation des cliniciens et des chercheurs à de nombreuses conférences notamment sur l'insuline orale et le pancréas bioartificiel.

Comme le comité, il nous semble aujourd'hui urgent d'attirer, par la création de cette unité, un « senior scientist » qui pourra coordonner, avec le directeur du laboratoire les activités.